COPP/MIT/1960/4

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REPORT
ON
MINOR IRRIGATION WORKS
(ANDHRA PRADESH)

COMMITTEE ON PLAN PROJECTS
(Irrigation and Power Team)
New Delhi
May 1960

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LETTER OF TRANSMITTAL

No. COPP/I&P/28/59
COMMITTEE ON PLAN PROJECTS

7, York Place,
New Delhi.
Dated the 29*th March*, 1960.

Dear Shri Pantji,

I have pleasure in forwarding to you the Report of the Minor Irrigation Projects Team on Minor Irrigation Works in Andhra Pradesh. The study and investigations were conducted under the able Leadership of my predecessor, Shri N.V. Gadgil, who relinquished the Leadership of the Team on 26th September 1959.

The Team paid several visits to the different districts of the State. Their findings are discussed in detail in the Report. The main recommendations of the Team are:—

(*i*) to implement the Master Plan of restoring old tanks;

(*ii*) to utilise the subsoil water and drainage water from the existing irrigation works as an extra source of minor irrigation; and

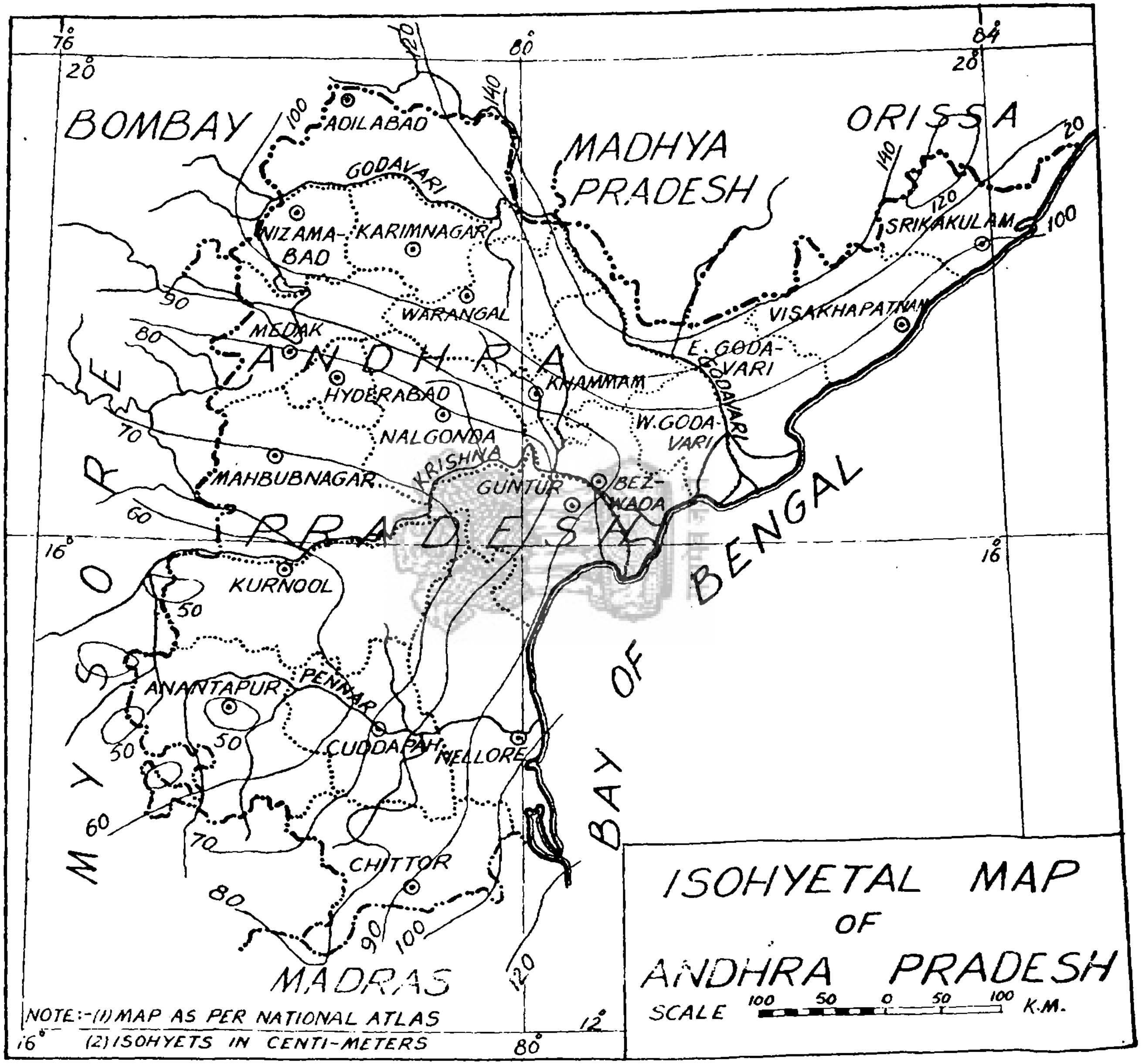
(*iii*) to recover the capacity of tanks lost due to silting, by raising the tank levels and adopting wherever feasible the Desilting-*cum*-Reclamation Scheme in order to reduce the area of submergence.

I take this opportunity of thanking you for the consistent interest you took in the Team's study and the guidance you gave from time to time during the study undertaken by the Team.

With respects,

Yours sincerely,
A.N. KHOSLA.

Shri Govind Ballabh Pant,
Minister for Home. Affairs,
Government of India,
New Delhi.



ISOHYETAL MAP OF ANDHRA PRADESH

NOTE:-(1) MAP AS PER NATIONAL ATLAS
(2) ISOHYETS IN CENTI-METERS

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PREFACE

This is the third* Report in the series issued by the Minor Irrigation Team appointed by the Committee on Plan Projects for study and investigation of the Minor Irrigation Works in the States of Mysore, Madras, Andhra Pradesh, Kerala, Uttar Pradesh and Punjab. The Team visited Andhra Pradesh in July 1958 to study the scope of work and methods to be employed. The Terms of Reference were communicated to the Leader of the Team by the Committee on Plan Projects under Memo No. COPP((4)/17/58 dated the 4th August 1958 (Appendix I). The composition of the Team was as follows:—

Shri N.V. Gadgil	Leader
**Shri M. Narasimhaiya, Chief Engineer (Retd.), Mysore.	Member
Shri Lal Singh, Director of Agriculture (Retd.), Punjab.	Member
Shri Mahavir Prasad, Irrigation Adviser to the Government of India, Ministry of Food & Agriculture.	Member Ex-Officio

Shri N.V. Gadgil relinquished the Leadership of the Team towards the end of September 1959. Later, Dr. A.N. Khosla joined as the Leader of the Team.

Shri D.S. Borker, Secretary to the Consultative Committee, Irrigation & Power Projects, also worked as Secretary to the Minor Irrigation Team.

2. Sarvashri J.C. Hardikar and A.R. Venkataraman, Chief Engineers, Andhra Pradesh were associated with the Team's work which was considerably facilitated by their willing co-operation. The Members of the Team had several discussions from time to time with the Chief Engineers and the Director of Agriculture and also visited Minor Irrigation works in the districts of Nellore, Guntur, Medak and Hyderabad. Case-studies were carried out on some of the tanks in operation, selected at random from the districts of Nalgonda, Warangal, Khammam, Guntur, Kurnool and Krishna.

3. The Team's main recommendations are:—

(*a*) to implement the Master Plan of restoring old tanks;

(*b*) to utilise the subsoil water as well as the drainage water from the exsiting irrigation works as an extra source of minor irrigation;

(*c*) to recover the capacity of tanks lost due to silting, by raising the tank levels and adopting wherever feasible the Desilting-cum-Reclamation Scheme in order to reduce the area of submergence; and

(*d*) to revise water-rates to rational limits.

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*First two Reports on Mysore and Madras States were issued in September 1959 and November 1959 respectively.

**Ceased to be a Member from 22nd February 1959 and hence the benefit of his advice was not available to the Team in the studies undertaken thereafter.

4. We take this opportunity to convey our gratitude to Shri V.T. Krishnamachari, Deputy Chairman, Planning Commission for his keen interest shown in the Team's work. We also wish to place on record the high appreciation of the Team for the competent services rendered by the Secretary of the Team, Shri D.S. Borker and Shri S.G. Balekundry, Superintending Engineer attached to the Team.

CHAPTER I

WATER AND LAND RESOURCES AND THEIR UTILISATION

Andhra Pradesh is located entirely in the Torrid Zone between Latitude 13° N to 20° N. The main drainage basins in the State are those of rivers (*a*) Godavari, (*b*) Krishna, (*c*) Vamsadra, (*d*) Nagavalli, (*e*) Pennar, (*f*) Coastal Rivers, and (*g*) Palar.

From the Isohyetal Map facing page 2, Andhra Pradesh can be divided into following regions, in order of total rainfall received:—

I. Northern Coastal Andhra and Northern Telangana
(Average rainfall 40″ to 50″).

	CM	*Inches*	*Basin*
1. Srikakulam	120	(47·5)	(c)
2. Visakhapatnam	120	(47·5)	(f)
3. East Godavari	120	(47·5)	(a)
4. West Godavari	105	(41·5)	(a)
5. Adilabad	110	(43·5)	(a)
6. Nizamabad	105	(41·5)	(a)
7. Karimnagar	115	(45)	(a)
8. Warangal	110	(43·5)	(a) (b)
9. Khammam	115	(45)	(a) (b)

II. Mid Telangana and South Coastal Andhra
(Average Rainfall 30″ to 40″)

10. Medak	90	(35·5)	(a) (b)
11. Hyderabad	80	(31·5)	(b)
12. Nalgonda	80	(31·5)	(b) (a)
13. Krishna	90	(35·5)	(b)
14. Guntur	80	(31·5)	(b) (d)
15. Nellore	90	(35·5)	(c) (d)
16. Chittoor	85	(33·5)	(c) (d) (e)

III. Rayla-Seema and Mehboobnagar District of Telangana
(Average Rainfall 20″ to 30″)

17. Mehboobnagar	65	(25·5)	(b)
18. Kurnool	60	(23·5)	(b) (c)
19. Anantapur	55	(21·5)	(b) (c)
20. Cuddapah	70	(27·5)	(c)

The normal average precipitation is 37 inches and is mostly received by South-West and North-East Monsoons. The South-West Monsoon starts from the West Coast in June, registering local heavy falls in many parts of the State, and remains active till end of September accounting for 25 inches of rainfall during this period. Following the South-West Monsoon is the North-East Monsoon which starts from October and may extend till December. The showers received are, however, light and uncertain and register about 8 inches of rainfall during this period. Both winter and summer periods account for hardly 4 inches of rainfall.

The coastal Andhra which comprises the districts of (1) Srikakulam, (2) Visakhapatnam, (3) East Godavari, (4) West Godavari, (5) Krishna, (6) Guntur, (7) Nellore as also portions of Chittoor and Cuddapah receive about one third of their rainfall from the North-East Monsoon, in addition to North-West Monsoons. Whereas in the non-coastal portion of Andhra Pradesh the North-East Monsoon contributes only about 6 to 15 per cent of total.

By and large, the annual rainfall is uneven and at times inadequate even in districts of assured rainfall such as coastal districts in Andhra Region, and Adilabad and Nizamabad Districts in Telangana Region, as may be seen in Appendix II-A.

Therefore, wet crops like paddy need irrigation throughout Andhra Pradesh and in Region III even dry crops need irrigation for optimum yields.

In addition to the rainfall in its territory, the Andhra Pradesh which is situated at the mouths of mighty Godavari and Krishna, has the benefit of the flows coming down these rivers whose sources are in other States i.e. Orissa, Maharashtra and Mysore.

2. The area of Andhra Pradesh is about 106 thousand square miles and the total population is 31.3 millions giving an average density of 295 per square mile. District-wise land utilisation is given in Appendix II-B and the gist of the same is as given below :–

	Million Acres	*%Tota*
I. Forests and Groves	14·6	22
II. Non-agricultural and Uncultivable	10·5	16
III. Pastures and Fallows	13·5	20
IV. Cultivated (Net Sown) land	27·9	42
TOTAL ..	66·5	100

Presently only 42 per cent of the total land is put to agricultural use. Assumming that Item I (Forests and Groves) would not be encroached upon and half of Item III (Pastures and Fallows) wouldbe eventaully put to agricultural use, the cultivated land would go up to about 50 per cent of the total.

3. The cultivated land is 27.9 million acres, and out of this, double crops are raised on 2.5 million acres, thus bringing the total cropped area to 30.4 million acres, which means roughly one acre of crop per capita.

4. 7.9 million acres (inclusive of 1.2 million acres of second crop) were irrigated by various works (minor and major) in the year 1955-56, which is about 26 per cent of the cultivated land (30.4 million acres). The district-wise

distribution of the irrigated land under various means of irrigation in the year 1955-56 is given in Appendix III-A which is summarised below:—

Sl. No.	Sources	Million Acres	% of Total Irrigated land
1.	Govt. canals	3·13	46·0
2.	Private canals	0·06	0·9
3.	Tanks	2·64	39·0
4.	Wells	0·70	10·3
5.	Spring channels & other sources	0·25	3·8
	TOTAL	6·78	100·0
6.	Second crop irrigation	1·12	16·5
	GRANT TOTAL	7·90	116·5

From the above Table it is evident that the largest source of irrigation is the Government canals (*i.e.* major irrigation works) which account for 46% of the total irrigated area. The tank irrigation is the second largest accounting for 39% of the total. The other minor sources of irrigation like wells, spring channels and private canals account for the remaining 15% irrigated area. In other words, minor sources of irrigation account for 54% and the major sources for 46% of the irrigated area, thus establishing the importance of minor sources of irrigation.

5. The development of irrigation from 1952-53 to 1957-58 is as tabulated below:—

(in thousand acres)

Year	Govt. canals	Private canals	Tanks	Wells	Other sources	Total
1952-53	2,956*	53	1,855	707	157	5,728
1953-54	2,966*	73	2,655	694	243	6,631
1954-55	3,008*	70	2,490	748	207	6,523
1955-56	3,129*	64	2,639	703	254	6,789
1956-57	3,114**	35	2,916	535	200	6,800
1957-58	3,006**	38	2,746	510	313	6,513

After the Third Five Year Plan considerable additional area will be brought under irrigation, under various large and small projects. Nagarjunasagar Project alone would add another 3.2 mı̃llon acres.

*Season and Crop Report of Andhra Pradesh for the Agricultural Year 1955-56 (Fasli 1365).

**Figures obtained from the Bureau of Economics & Statistics, Government of Andhra Pradesh.

CHAPTER II

MAINTENANCE OF MINOR IRRIGATION WORKS

The tanks numbering 58,527 which form the bulk of Minor Irrigation Works in the State, pose the main problem of maintenance. Out of these, a little over 25,000 tanks are in the Andhra Region (portion of the former Madras State) and 33,000 in Telangana (portion of former Hyderabad State).

In Andhra Pradesh, no less han 2.6 million acres of cultivated land is irrigated by these tanks. In fact, Andhra Pradesh is studded all over with irrigation tanks which lend to the State peculiar characteristics of tank system of irrigation. Appendix III-B gives the district-wise distribution of irrigation tanks in the State as also the actual area irrigated during 1955-56 in relation to the settled ayacuts of these tanks. 85 per cent of the total number of tanks have ayacuts less than 100 acres. The Telangana Region in the State contains larger number of irrigation tanks (32,980) than the Andhra Region (25,547). But, the settled ayacut in the latter is greater (1,685,898 acres) than in the former (1,300,988 acres). The average irrigation figures for the year 1955-56 are 60 acres per tank in the Andhra Region and 34 acres in the Telangana Region as against an average of 47 acres for the State as a whole.

2. From the Technical Note of the Chief Engineer, General, (Appendix IV), it is seen that:—

(*a*) the gap between the registered ayacut and the actual on account of the tanks being in disrepair is of the order of about 0.7 million acres;

(*b*) the total amount required for (*i*) the purpose of restoring the tanks to P.W.D. Standards and (*ii*) developing the gap between the settled ayacut and the actual is of the order of 16 crores of rupees (11 for Andhra Region and 5 for Telangana);

(*c*) the provision during Second Five Year Plan for this purpose being about 2.3 crores (1.6 for Telangana and 0.7 for Andhra) future provision for completion of the task is of the order of 13·7 crores;

(*d*) about 6,000 tanks are already restored in Telangana Region and another 27,000 await restoration. There is a special circle to survey and estimate the restoration schemes in this Region; and

(*e*) survey estimates for the Govt. tanks in Andhra Region were already carried out by (old) Madras Government and about 10,000 (out of 25,547) tanks are already brought to standards. The 13,000 tanks newly acquired from ex-zamindars, which were neglected for a long time and badly lack in standards, are yet to be surveyed in addition to other tanks. All the survey work involved is being done by regular P.W.D. staff.

The Team suggests that the desirability of having a special survey circle for Andhra Region also may be seriously considered so as to expedite the remaining work of restoration etc. It would also be important to draw out standards for 13,000 tanks taken over from ex-zamindars so that the maintenance arrangements which are made, provide strict adherence to design and procedure set by these standards. In addition, it is recommended that every effort be made towards recovering the capacity lost due to silting. For this a special scheme of raising the bund and waste-weirs so as to increase the capacity wherever justified needs to be launched.

One of the main reasons for silting of tanks in Andhra area seems to have been cultivation in the fore-shore area. It will, therefore, be desirable to consider the possibility of regulating the cultivation in the fore-shore area so that the tanks do not silt up rapidly and their storage capacities are maintained.

In order to minimise the area of submergence on raising the F.T. Level, the Desilting-cum-Reclamation Scheme as evolved by Madras State and referred to in the Team's Reports on Mysore and Madras States, may be adopted with advantage, provided such a course is found economically feasible on balancing the cost of desilting with the likely returns on sale of lands reclaimed. The Team is glad to place on record that the Andhra Pradesh Government have under consideration undertaking this scheme on six typical tanks, (Appendix V).

Weed-growth is noticed at the shallow fringes of some of the tanks. It is seen from the following table* showing water requirements in ponds per pound of dry matter, that the weeds require largest amount of water:—

Crop	Water per lb.	Crop	Water per lb.	Crop	Water per lb.
Pros Millet ..	293	Barley ..	584	Russian Thistle ..	336
Kursk Millet ..	261	Oats ..	597	Gum Weed ..	608
Feteria ..	323	Sweet Clover ..	770	Sun Flower ..	683
Corn ..	268	Alfa-Alfa ..	831	Lambs Quarter ..	801
Wheat ..	513	Pig Weed ..	287	Rag Weed ..	948

Therefore, it is necesary to devise suitable ways and means to counter the weed-growth and save the water being lost. Wherever feasible, desilting the tanks and reclaiming the shallow fringes infested with weeds is recommended as one of the measures to fight the weed growth.

Quite a large number of tanks in Andhra Pradesh are situated in the command of new major and medium projects which are being constructed or are contemplated. It was observed on a few tanks situated in the command of already completed major and medium projects that the cultivators were keen on continuing irrigation from these tanks. It will be desirable that the State Government adopts a definite policy on continued maintenance of such tanks. The retention of such tanks as independent sources or as sources supplemented by the projects under reference, needs to be examined on merits.

3. The current practices with regard to agencies for maintaining the tanks are as under:—

(*a*) In Andhra Region, tanks with ayacuts 200 acres and more are looked after by the State P.W.D. and the rest by Revenue Department, through their Minor Irrigation staff.

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*From "Weed Control" by Wilfred W. Robins.

(*b*) In Telangana Region, tanks with ayacuts of 100 acres or more are in charge of the P.W.D. and the rest are looked after by the Revenue Department.

In order to have a uniform policy of maintenance in the two Regions as well as to increase the efficiency of maintenance, taking into account the new Panchayat System, the Team recommends that:—

(*a*) The Revenue Department may maintain tanks in Andhra and Telangana where the ayacut is between 200 acres to 50 acres;

(*b*) All tanks below 50 acres of ayacut may preferably be maintained by Panchayats;

(*c*) As and when the Panchayats build up their efficiency and experience, more and more of the tanks looked after by P.W.D. and Revenue Department may be progressively transferred to Panchayats, beginning with the Revenue Tanks, first; and

(*d*) A cess may be imposed on the lands irrigated by each tank for meeting the maintenance expenses.

4. Appendix VI gives a gist of case-studies done by the Team on 20 Tanks selected at random with a view to ascertaining the general condition of maintenance. It is observed that there are cases of the following nature:—

(*a*) revetments being in a disturbed state;

(*b*) growth of trees and shrubs on the bunds; and

(*c*) encroachment on foreshore lands (Peramboke).

All these need to be attended to.

5. One of the causes of breach attributable to maintenance system is that the cultivators in Telangana resort to blocking the waste-weirs by means of earthen-bunds in order to increase the storage, which they do not care to remove before the advent of floods. The State need to take emergent steps to stop this practice of unauthorised raising of weirs. Extra storage may be effected by providing regular shutters which the maintenance organisation should remove before floods.

6. Another mode of irrigation that is being developed is the diversion weirs and channel irrigation from stream-flows. The main maintenance problem of such works is to keep the channel take-offs free from getting silted up. For this purpose scouring sluices need to be regularly operated by the maintenance agency. In many cases the weirs are located in a village upstream of that where irrigation is done, with the result that nobody as a rule cares to operate the sluices and thus their purpose is defeated. Positive steps to appoint maintenance parties at the weir site are indicated.

7. The procedure for sanctioning grants for maintenance of P.W.D. Tanks is different in Andhra and Telangana Regions:—

(*a*) No regular annual grants for each tank is given in Andhra Region. A lump sum grant is placed at the disposal of each Division, which is spent on tanks where repairs are called for.

(*b*) In Telangana, regular maintenance grants are sanctioned as a fixed amount per acre.

The Team considers it desirable that the merits in both the systems be combined judiciously as there are advantages in each system. This need ensure that every tank gets a certain minimum annual maintenance to attend to, while at the same time, where the needs of the situation require it, special funds will be made available for the necessary repairs.

8. The system of routine inspection of tanks in charge of Revenue Department in Andhra Region is what is known as "circle system", evolved by the (old) Madras Government. In this system, each Taluk is divided into a number of circles, and the inspection of Minor Irrigation sources in each circle is attended to by rotation at a frequency of once every 4 to 5 years, each inspection being followed by necessary repairs. It is understood that this system has now been extended to Revenue Tanks in Telangana Region also, which is a step in the right direction.

9. To facilitate actual execution of repairs to tanks in charge of Revenue Department, the departmental authorities right down to village headman are empowered, under Madras Compulsory Labour Act (1858)—also called Khudi-Marammat Act (Appendix VII), to conscript the necessary labour from the local residents on a compulsory basis, for attending to emergent repairs etc. The provision of this Act has now been extended to the Telangana Region also. Active steps need to be taken urgently to enforce the provisions of this Act.

10. Formerly repairs and restoration works were entrusted to contractors, on calling for competitive tenders. Now preference is to be given to the following alternative, failing which contractors are to be employed:—

(*a*) If Bharat Sevak Samaj wants to take up the works, the same is to be given by negotiation at rates 5% below estimates; or

(*b*) An ayacutdar may be entrusted with the work.

In the case of small and scattered works where neither of the above are willing to take up the works and contractors also may not be interested to execute works at reasonable rates, the Team suggests grouping up of a number of such repair works in the vicinity totalling to about Rs. 50,000, and giving them to bigger contractors, who would be then in a better position to execute the works at reasonable rates.

11. The Team observed that the Andhra Pradesh Government has taken steps to relax the P.W.D. Code Rules, without insisting on the payment of Security Deposit by the Ayacutdars, Labour Co-operatives and the Bharat Sevak Samaj. Also the State is allotting work to Ayacutdars without calling for tenders. Details of action taken by the State are given in Appendices VIII A, B and C.

12. The Team suggests that the State may encourage removal of silt from the bed of the tanks for use on manurial purposes.

13. According to the prevalent practice, water from the tanks is distributed to the ayacutdars under the supervision of 'Nee Reddy', the sluiceman. Paid only a token sum of Rs. 5 per month by the Government, the sluiceman is mostly dependent on the ayacutdars for the remaining emoluments, which are received in the form of fixed Faslana or Inam at the time of maturity of each crop. Since the receipts from his clientele are irregular and also inadequate, the sluiceman displays little interest in exercising proper supervision over the distribution of water. Devoid of incentives and regulatory functions, the sluiceman is inclined to leave the water distribution system

almost entirely in the hands of the ayacutdars. Consequently, the existing arrangements of water distribution suffer from inadequate supervision resulting in unnecessary and avoidable wastage of water available in limited quantity in the tanks.

14. A preliminary study by Irrigation Department, in respect of 301 tanks in Andhra Pradesh had revealed the water-spread to ayacut ratio as 1.0 : 1.2. Since the sample study was not sufficiently comprehensive, as it represented only 0.5 per cent of the total number of tanks in the State, the scope of the study was enlarged to cover over 5,000 tanks on lines followed in respect of Mysore State. Reference to Descriptive Memoires of Irrigation Works showed that the area coming under submergence at F.T.L. was not given for all the districts of Telangana Region, but the information was available for Andhra Region of the State where the water-spread area of tanks had been recorded in million square feet for individual tanks. Out of 5,204 tanks under study, requisite information in detail was not available for 1,019 tanks, so that detailed information about water-spread area and settled ayacut could be recorded only for 4,185 tanks which gave a total registered ayacut of 3.94 lakhs acres against water-spread of 3.06 lakhs acres, thereby giving a ratio of 1.3 : 1. Considering that the area actually irrigated is in most cases much lower (Appendix IX-A) than the registered ayacut of the tank, the ratio of "water-spread of tank to area of ayacut" would turn out to be an acre for acre. Further, an analysis of data of each individual tank has revealed that in no less than twenty-seven per cent (1,144) of the tanks studied, the water-spread area was greater than their corresponding ayacut. The total water-spread area of such tanks aggregated to 1.35 lakh acres against an ayacut of 0.8 lakh acres, giving 1.6 : 1.0 ratio of water-spread to ayacut. Further, 43 tanks were found to have a total ayacut of 1,750 acres against 9,516 acres of water-spread, and in some cases the water-spread to ayacut ratio ranged from 4:1 to 77:1. On the basis of 4,185 tanks studied, giving a ratio of even 1.3 acre of ayacut to 1 acre of water-spread, the water-spread area of 58,527 tanks in Andhra Pradesh would correspond to 24.0 lakh acres against the registered ayacut of 31.2 lakh acres. This huge area under water-spread should, therefore, be a matter of serious concern so far as evaporation losses are concerned.

15. Results of experiments conducted in various countries, as also in different parts of India, on evaporation losses from free surface of tanks have shown that these losses vary from 45″ to 150″ per year or even more. In Andhra Pradesh annual evaporation losses at four different stations representing the two regions, have been estimated at 58.88 inches at Coccnada, 92.89 inches at Kurnool, 113.34 inches at Hanam Konda and 113.86 inches at Hyderabad, thus giving an average annual loss of 94.7 inches in the State as a whole. Appendix X gives monthly record of evaporation losses at the above stations. In fact, the evaporation losses may actually turn out to be much higher than 94.7 inches as the number of tanks is comparatively larger in areas with heavier evaporation losses—4,357 tanks around Hanam Konda station as against 518 tanks around Kurnool Station.

16. Results of experiments conducted to ascertain the effect of monomolecular films of cetyl alcohol compounds on the evaporation of water at different temperatures have shown that at a water temperature of 68° F, there has been sixty per cent reduction in evaporation. All such remedial measures are strongly recommended so as to minimize the avoidable losses of water which could otherwise be rendered available in the existing tanks for further irrigation.

CHAPTER III

DESIGN AND CONSTRUCTION OF MINOR IRRIGATION WORKS

As already indicated, Tank irrigation is the largest single source of minor irrigation, accounting for roughly 2.64 million acres out of a total of 3.65 million acres irrigated by minor works (*i.e.* 73% of minor irrigation). The total number of tanks already in existence in Andhra Pradesh is as high as 58,500 and many more would be added in due course. It is already indicated that many tanks have breached, especially in Telangana Region. Therefore, it is absolutely necessary to review the design practices so that maximum economy coupled with maximum safety from frequent breaches is ensured. With this object in view, case study was done on 20 Tanks selected at random (8 located in Telangana and 12 located in Andhra Region). The result of study of the bund and waste-weir details are as recorded in Statements I and II respectively.

2. With reference to Bund Design, the Team has to observe the following :—

(*a*) The top widths of bunds (which vary from 4′ to 120′ in the case of the 20 tanks studied) need to be standardised. A minimum of 8′ may be prescribed.

(*b*) Water side slopes of several tanks appeared steep. It may not be advisable to have slope steeper than 2:1.

(*c*) The rear slopes are generally 2:1. In the case of bunds not higher than about 20′, economy could be effected by providing steeper slopes in the rear 1½:1, as it is possible to control the hydraulic gredients of the seepage water by providing drainage in the bed of the bunds.

Further, it is noticed that there have been in all 38 breaches to-date in these 20 Tanks. The reasons of these breaches are:

Reasons	*No. of breaches*
1. Overtopping	14
2. Erosion of bund	16
3. Piping	5
4. Unrecorded	3
	38

Since breaching due to erosion of bund is only an accomplice in overtopping, the gross number of overtopping failures are 30 or roughly 80% of **total.** Only 20% failures are due to piping or unknown causes.

STATEMENT 1

Study of bund details

Sl. No.	Name of Tank and Districts	Maximum Height of bund (feet)	Top width of bund (feet)	Slopes of bund: Front: Revetted portion	Slopes of bund: Front: un-revetted portion	Slopes of bund: Rear	Number of breaches due to: Over-topping	Number of breaches due to: Piping	Number of breaches due to: Erosion of bund	Number of breaches due to: Unrecorded reasons
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	A—ANDHRA REGION									
	Guntur District									
1.	Konidena Sircar Cheruvu	15·0	4—5	1½:1	—	2:1	—	—	—	1
2.	Lakshmi Guruvaiah Cheruvu	13·5	6	1½:1	—	2:1	—	—	—	—
3.	Bhavanasi Tank System	20·0	6—10	2 :1	—	2½:1	—	—	—	—
	Kurnool District									
4.	Markapur Tank System	22·0	(I) 6 (Bund) (II) 16 (Road)	1½:1	—	2:1	—	5	—	—
5.	Cumbum Tank System	(I) 52.0 (Main) (II) 31·0 (Left)	66—120 55	1½:1	—	2:1	—	—	—	—
	Krishna District									
6.	Sher Mohammed Pet Tank	16·0	4	1½:1	2:1	2:1	1	—	—	—
7.	Jaggayyapet Tank	21·5	5	1½:1	2:1	2:1	—	—	—	—
8.	Paritala Tank	15·0	6	1½:1	2:1	2:1	3	—	—	—
9.	Marlapadu Tank	10·0	4	1½:1	2:1	2:1	1	—	—	—
10.	Veeravalli Pedda Tank	12·0	4	1½:1	2:1	2:1	—	—	—	—
11.	Nuzvidu Tank	19·0	4	1½:1	—	2:1	1	—	—	—
12.	Advinakkalum Ura Tank	12·0	4	1½:1	2:1	2:1	1	—	—	—
					TOTAL	..	7	5	—	1

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	B—TELANGANA REGION									
	Nalgonda District									
13.	Ekvacheroo Vangapalli	13·00	8·0	1½:1	2:1	2:1	1	—	1	—
14.	Kothacunta Kolpak*	11·00	6·0	1½:1	2:1	2:1	2	—	1	—
	Warangal District									
15.	Peddacheroo Pembarthy	18·05	8·0	1½:1	2:1	2:1	1	—	—	1
16.	Thegalcunta Pedda Pendial*	10·60	6·0	—	2:1	2:1	3	—	4	—
17.	Sengasanicunta Pedda Pendial*	15·00	6·0	1½:1	2:1	2:1	—	—	2	1
18.	Peddacheroo Komatpalli	12·00	6·0	1½:1	2:1	2:1	—	—	8	—
	Khammam District									
19.	Ooracheroo Kukreni	11·00	4·5	1½:1	2:1	2:1	—	—	—	—
20.	Pancheroo Ananthawaram	20·00	10·0	1½:1	2:1	2:1	—	—	—	—
					TOTAL ..		7	—	16	2
				GRAND TOTAL			14	5	16	3

*These Tanks are breached. The details are as proposed in the estimates prepared to restore them.

STATEMENT II

Study of Waste-Weir Capacities

Sl. No.	Name of Tank and District	Catchment area in sq. Miles =A	Length of waste-wier crest =L (feet)	Free Board from waste-weir crest		Safe flood discharging capacity provided= $Q_o = 3.1 \times L \times h^{1\cdot5}$	Maximum flood as per Inglis $Q = \frac{7000A}{\sqrt{A+4}}$	Percentage of capacity over Inglis Flood= 100·Qo/Q
				Upto top of bund=H (feet)	Upto 3′ below T.B.L.=h =H—3′ (feet)			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	A—ANDHRA REGION							
	Guntur District							
1.	Konidena Sircar Cheruvu	5·10	180	4·50	1·50	1025·0	11821	8·7
2.	Lakshmi Guruvaiah Cheruvu	1·50	180	4·00	1·00	558·1	4587	12·3
3.	Bhavanasi Tank System	43·00	550	8·25	5·25	20510·0	43878	46·8
	Kurnool District							
4.	Markapur Tank System	32·15	(I)538 (II)78	6·27 8·00	3·27 5·00	9414·0 2704·0 12118·0	37446	32·4
5.	Cumbum Tank System	430·00	230	16·86	31·86	36270·0	144503	25·1
	Krishna District							
6.	Sher Mohammed Pet Tank	15·17	200	5·00	2·00	1754·0	24244	7·2
7.	Jaggayyapet Tank System	5·32	205	6·30	3·30	3810·0	12210	31·2
8.	Paritala Tank	19·00	700	7·00	4·00	1736·0	27766	6·3
9.	Marlapadu Tank	5·98	171	4·50	1·50	973·8	13247	7·4
10.	Veeravalli Pedda Tank	8·00	160	5·00	2·00	1403·0	16185	8·7
11.	Nuzvidu Tank	8·20	300	4·70	1·70	2061·0	7207	12·0
12.	Advinakkalum Ura Tank	8·00	100	5·00	2·00	876·8	16185	5·4
	B—TELANGANA REGION							
	Nalgonda District							
13.	Elvacheroo Vangapalli	2·68	230	6·00	3·00	3704·0	7464	49·6
14.	Kothacunta Kolpak	4·56	166	5·50	2·50	2033·0	10894	18·7

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Warangal District							
15.	Peddacheroo Pembarthy	3·84	354	6·50	3·50	7186·0	9600	74·9
16.	Thegalcunta Pedda Pendial	0·88	434	6·50	3·50	8810·0	2800	314·8
17.	Sengasanicunta Pedda Pendial	2·00	117	6·50	3·50	2375·0	5714	41·6
18.	Peddacheroo Komatpalli	3·00	238	5·50	2·50	2916·0	7925	36·8
	Khammam District							
19.	Ooracheroo Kukreni	0·34	141	3·00	0·00	0·0	1135	0·0
20.	Pancheroo Ananthawaram	4·84	145	5·50	2·50	1776·0	11407	15·6

3. From a comparison of the discharging capacity of waste—weirs with figures of flood discharge as calculated according to Inglis formula*, for instance, the Team has got the over all impression that the design for surplussing arrangements on tanks generally needs upward revision especially in cloud burst zones in the light of experience gained in recent years. Therefore, it is the considered view of the Team as already observed in the case of Mysore and Madras Tanks, that under-provision of wasting capacity is the dominant cause of tank breaches and the Team has to reiterate that the Design-practices of waste-weir are thoroughly reviewed, and adequate capacities provided on all new tanks and those old tanks as are taken up for restoration, after basing the design flood on detailed meteorological considerations and using modern principles of Unit Hydrograph etc. In the Western portion of former Hyderabad which is frequently visited by unexpected cloud bursts, it will be advisable that the area, particularly susceptible to frequent cloud bursts is demarcated in consultation with the Meteorological Department of the Government of India. All the tanks in this area need be provided with bigger surplussing capacities by having larger weirs of improved efficiency. The Team would also suggest that the upper tanks in a chain of tanks are attended to as a priority measure so that if there is a heavy flood discharge from an unrestored tank it does not damage the tank situated lower down.

4. In Chapter II, the incidence of silting up of channels from diversion weir was referred to. To minimise such silting tendencies, adequate provision of scour sluice near the take-off is necessary. It may also be desirable in many cases to provide sufficient number of gates in preference to solid weirs.

5. Prior to reorganisation of States in November 1956, the Bombay P.W.D. Specifications were in vogue in old Hyderabad, whereas Madras Specifications were followed in Andhra Region. Now, the latter are being applied throughout Andhra Pradesh.

As recommended in para 2.2, Chapter III of the Madras Report, Specification No. 20-A providing for consolidation and tamping needs to be applied to all bank-work of Tank Bunds upto maximum water level.

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*Actually in (old) Madras as also in Old Hyderabad States, the Ryve's formula ($Q=675\,A^{2/3}$) was evolved. But as it was found that this formula fell too short of actual floods since a co-efficient as high as 2700 has been observed in Madras State (vide page 33 af 'Estimation of Design Flood' issued by Central Water & Power Commission), for the sake of comparison here the Inglis formula has been adopted.

CHAPTER IV

IRRIGATION DEVELOPMENT

The total irrigated area in Andhra Pradesh is 6.78 million acres and constitutes 24.3 per cent of the cultivated area in the State. About 75 per cent of the area under cultivation is thus rainfed which points to obvious need and scope for extension of irrigated area. Dry land coming under irrigation appreciates greatly in value. Case-studies of tanks, Appendix IX-B, have revealed that the price of wet land varied from Rupees one thousand to three thousand per acre as against Rupees one hundred to five hundred per acre for dry lands. By and large, dry lands on being converted into wet lands as a result of irrigation, appreciate at least twice, and frequently much more in their value.

2. During its visit to Hyderabad, Nalgonda, Medak and Warangal Districts, the Team observed rugged and rocky terrain spread over vast areas. Paddy cultivation is practised only in depression areas under irrigated conditions with water from tanks and wells existing in small numbers. The initial rainfall in these areas is accordingly limited by the availability of water received up to that period. In the upper ridges, crops like castor, jowar, and millets are grown under rain-fed conditions and their condition, by and large, was disappointing. In view of the undulating nature of lands, large scale irrigation by canals is not possible in such areas, particularly in Nalgonda District. According to the Chief Engineer, Nagarjunasagar and Godavari Canals cannot command this district and the Minor Irrigation potential in this district and even in the State as a whole, was said to have been almost exhausted. The Team, however, encountered many wells in Nalgonda, Hyderabad and Medak Districts on either side of the highways. The water table in these wells generally varies from 12 to 20 feet which somewhat recedes by April-May but rises again during the rainy season. The cost of sinking wells, it was learnt, varies from Rs. 2,000 to 3,000 depending upon the underground strata. At places in Nalgonda, Hyderabad and Medak Districts, the Team was informed that the sinking of wells on large scale was limited by the presence of rocky patches in the underground strata. In the opinion of the Team, there is urgent need to conduct geophysical survey to ascertain the water potential in these areas and to formulate irrigation schemes to exploit the sub-soil water. The area irrigated by wells in the State in 1956-57 was 10.4 per cent and the wells are important in the districts of Nellore, Chittoor, Anantapur Cuddapah, Nalgonda, Karimnagar, Hyderabad, Mehboobnagar, Warangal and Medak. The results of geophysical survey would help in increasing the tempo of wells sinking schemes and thereby give a fillip to the Minor Irrigation Programme in the State.

3. Apart from considerable irrigation that can be secured by sinking new wells over large areas where water table is favourable, there is very great scope for the exploitation of sub-soil water in the ayacut of tanks. The water table in the ayacut of tanks varies from four to twenty feet with an average of about ten feet (Appendix IX-A). Maximum utilisation of this sub-soil water by lift irrigation is urgently called for, both for increasing the area under irrigation and to avoid water-logging in certain areas. The case-studies of tanks have pointed that

water-logging and even alkalinity were already noticeable in the ayacuts of Nalla Cheru, Madanpalli, Krishna Cunta Kothur in Hyderabad District and Krishna Sagar Tank in Medak District, Ekvacheroo Vangapalli and Kothacunta Kolpak in Nalgonda District. The problem of water-logging is likely to accentuate in tanks in such areas as would be commanded by irrigation water from Nagarjunasagar Project in the near future. Concrete steps have to be taken in advance to arrest the problems of water-logging; and lift irrigation lends suitable opportunity in this direction. Since the water table is on an average at a depth of ten feet, it would be economical to exploit the sub-soil water resources for growing non-paddy crops such as green fodders, groundnut, cotton, maize, pulses, oil seeds etc. Recourse to lift irrigation would necessitate the diversification of cropping pattern which will include such crops as have lesser water requirements for their growth and maturity than paddy.

4. Sporadic efforts have been made by the cultivators for the utilization of sub-soil water by digging open surface wells in the ayacut of some tanks. But there is urgent need for intensifying the efforts over large areas, wherever water is available at shallow depths and in enough quantity. Lift irrigation at an average depth of even ten feet should hardly be a problem to be reckoned with.

5. The Team noticed wells in the ayacut of Ekvacheroo Vangapalli in Nalgonda District and on fore-shore lands of Brahama Cheroo, Ganganpahar in Hyderabad District, where the owners had installed pumping sets operated by diesel engines. Numerous instances were encountered where wells were sunk by the cultivators in the ayacuts of many tanks, but water was lifted by mohats. The system of mohat is indigenous, cumbersome and inefficient in so far as a mohat can command 2 to 3 acres of land depending upon the crops grown. As against the mohats, the installation of Persian wheels (even if small pumps cannot be put in) which can command about 10 to 15 acres, would positively be more efficient and economical in the long run.

6. There appears a good scope for lift irrigation by installing pump sets on

(*i*) Existing successful wells;

(*ii*) New successful wells that may be dug in the low lands adjoining the ayacut of existing schemes;

(*iii*) Canal systems like Krishna Delta, Tungabhadra, K.C. Canals etc. where surplus waters could be lifted and supplied for irrigating upland areas not commanded by gravity flow; and

(*iv*) Streams.

Popularity of such lifts is increasing day by day on account of rural electrification programme undertaken by the State Government. In Andhra Region* alone the targets for Second and Third Five year Plans are of the following magnitude:—

	Provision Rs. Crores	No. of villages to be electrified	No. of pump sets to be connected
II Plan	10·7	1150	7,593
III Plan	20·0	2000	17,500

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*Figures for Telangana Region were not received.

The Team recommends the following measures to accelerate such ventures:—

(*a*) Until systematic Rural Electrification is developed Diesel engine pumps may be encouraged. The present criterion that the applicant for loan for pump needs to possess land worth at least double the loan amount, is rather too harsh and deters the cultivators from the venture. Relaxation of this criterion to the extent possible may be considered. Also, loan advances may be based on the potential of the land and not on the land assessment which proves generally too conservative.

(*b*) In addition to individually owned pump sets, it would be advantageous to encourage Co-operative Lift Schemes which would have the following distinct advantages:—

  (*i*) This would enable small farmers to get the benefit of such schemes who left to themselves would not be in a position to do so.

  (*ii*) It would result in few economical schemes rather than too many less economical units.

(*c*) It will be desirable to publicise all the details of the co-operative lift irrigation schemes that have come out successful and to encourage taking up of other lift irrigation schemes on similar lines.

7. The drainage water from upper irrigation ayacut could be picked up by means of diversion weirs and channels for further irrigation. Such schemes need to be launched wherever feasible preferably on the co-operative basis, with adequate Government help in the form of loans.

In order to increase irrigation potential it is necessary to carefully plan the ayacut of major schemes, so that the seepage water therefrom is availed of by minor schemes such as :

(*a*) Lift irrigation on the lands lower down the ayacut of the major schemes; and

(*b*) Diversion weirs from the drainage streams.

To encourage development of lift irrigation, the Team recommends liberal grants for digging wells and installation of pumps. Water Rates for such irrigation should also be low.

8. It is noticed that the main emphasis of the irrigators in Andhra Pradesh is mostly on growing paddy crop. This crop needs much more water than cereals and therefore, if the latter are to be grown in preference to paddy, much more quantity of foodgrains can be produced with a given quantity of irrigation water. Secondly, such a re-orientation would tend to result in a more balanced diet of the people. Therefore, the Team recommends that the State Authorities may consider the desirability of introducing such a re-orientation as early as practicable.

9. An essential pre-requisite of a well-planned irrigation project is the proper method of water distribution in the cultivated area. To meet these requirements a network of field channels is generally laid out simultaneously with the execution of the project. In Andhra Pradesh the non-existence of field channels in the ayacuts of the tanks is a common feature. Results

of the case study of 23 tanks in representative districts of the State also point to the absence of regular field channels in the ayacuts. At the time of irrigation, water from the tanks is allowed to overflow the fields and little attempt is made to restrict and regulate the flow of water, without any regard to the fundamental principles of irrigation efficiency. Scarcity of water on the one hand and its wastage due to lack of channels to serve the entire ayacut on the other, offer a strange anomaly in the tank system of irrigation in Andhra Pradesh that needs immediate attention. Therefore, it is recommended that necessary steps may be taken by the authorities in charge of tanks to get the water channels constructed, even by acquiring the necessary lands from the individual owners.

10. Yet another quick manner of increasing irrigation could be by constructing feeder channels to existing tanks to augment their supplies with whatever water resources remain untapped in the neighbouring streams. In a few cases the tanks are completely evacuated for catching fish. Irrigation development is thus retarded. The Team suggests that the main object of irrigation should have a priority over any other function that the tank happens to serve.

CHAPTER V

AGRICULTURAL ASPECTS

The present irrigation by tank system is mostly confined to Abi crops (*i.e.* rainy season). Observations based on case-studies of tanks (Appendix IX-B) have revealed that out of twenty three tanks studied, only in respect of eight tanks both Abi and Tabi crops were raised by tank irrigation, while in the remaining fifteen tanks irrigation was restricted to only Abi crops. The production of Tabi crops is limited by the inadequacy of water stored in the tanks which in some cases is just sufficient to mature only paddy as an Abi crop. In case water is surplus in the tanks, Tabi crop of paddy is grown over restricted areas by the joint decision of ayacutdars under intimation to the authorities concerned. The present inadequacy of water for Tabi crop is a result of increased emphasis on cultivation of paddy. Of the total area of crops irrigated in 1955-56,* 80% was under paddy; 11% under millets, other cereals and pulses; 2% each under oilseeds and sugarcane, and the remaining 5 per cent under cotton, tobacco, chillies, vegetables etc. As paddy requires abnormal quantity of water (72 inches), its production is economical only where water is cheaply available in abundance. Its cultivation presupposes flow irrigation; lift irrigation for paddy is too expensive. Under the conditions obtaining at present, undue emphasis on the production of second paddy crop and lack of enthusiasm and even disregard for the production of non-paddy crops in the Tabi season does not appear to be justifiable in the context of opportunities for lift irrigation available in and around the tank ayacuts. There is much scope for intensive irrigation and consequently better utilization of the existing irrigation facilities in the State.

2. Apart from the question of utilizing the limited quantity of water for irrigating maximum area, the Team went into the question of economic return from various crops to the cultivator. Discussions with the officials of the State Agriculture and Irrigation Departments, as also the ayacutdars have revealed that it is feasible and even worth-while to raise non-paddy crops like maize, groundnut, cotton, ragi, wheat, vegetables, and fodders which yield equally good, if not better, returns per acre as compared to paddy. Figures furnished by the Agriculture Department (Appendix XI) also testify that per acre return from paddy crop (Tabi) is Rupees forty to seventy, for wheat Rupees sixty to ninety, for onions Rupees eighty to hundred and for tobacco Rupees one hundred and forty to three hundred.

Change in the cropping pattern and recourse to lift irrigation will have many advantages like, (a) additional area under crops and consequently additional production of food (*b*) more income to the cultivators, (*c*) more revenue to the Government, (*d*) appreciation in the value of the land, (*e*) lesser chances of water-logging and (*f*) better utilization of water which has remained unexploited so far.

3. Although no wholesale change in the cropping pattern and dietetic habits of the people is envisaged, even modification to a small extent in both directions can bring about far reaching results. Reduction in the paddy area, even to the extent of twenty per cent, would tantamount to propor-

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*Vide Season and Crop Report of Andhra Pradesh for the Agricultural year 1955-56.

tionate reduction in the demand for water which, if rendered available, should be sufficient for double or three times the area under other crops like ragi, jowar, wheat etc. Similarly a change in the dietetic habits of the people even to the extent of 10 to 20 per cent would imply sufficient reduction in the demand for rice and proportionate increase in the consumption of non-paddy food crops, if grown there. In this connection, the example of Punjab is worth noting. In the pre-partition period the consumption of rice was almost neligible and unknown to most people but it has now become an important component of people's diet. Consequent on re-organization, the State was faced with the food problem and because large portion of its area got water-logged and plenty of water became available at nominal cost, the production of rice was necessitated and even justified by the exigencies of circumstances and it did not take long for the people to take to rice. In South also similar change in the dietetic habits of the people and diversion of area under non-paddy crops is perhaps called for in due course of time, more so when it is realized that rice is an unbalanced diet as it contains largely starch or carbohydrates.

The State Agriculture Department being fully alive to this problem are taking some measures to bring about necessary change in cropping pattern. It is understood that change in cropping pattern has beer effected in Puller and Vijara Taluks in Khammam District and Tandur Taluk in Hyderabad District, where groundnut cultivation has been introduced with success. In the two Taluks of Khammam District, 6,000 acres have been brought under groundnut cultivation alone.

To stimulate interest and initiate early and extensive change in the cropping pattern it will be necessary to organize vigorous campaign through layout of demonstration of plots on the cultivators' fields. In the erstwhile Madras State, some irrigation schemes were sanctioned for the construction of reservoirs, improvement of channels, and the restoration of old tanks in the Districts of Anantapur, Bellary, Cuddapah, Kurnool, Nellore etc. Realizing that paddy crop requires an abnormal quantity of water as compared to non-paddy crops, the State Government directed that under the Tungabhadra Channels, irrigation charges for the cultivation of jowar need not be collected for encouraging the farmers to increase the area under that crop. Similarly, no levy was charged for water made available to irrigate summer ragi crop in Cumbum Valley. This concession was further extended to other fodder crops and millets with a view to economise water without prejudice to the "Grow More Food" drive. In the opinion of the Team, concessions of similar nature are also called for in Andhra Pradesh so that rice cultivation is confined only to areas where its production potential is high and the remaining areas are put under non-paddy crops.

4. An important consideration in the application of water to crops is the adoption of ways and means that promote its effective and economic utilization. Such practices involve not only desirable knowledge about soil-moisture relationship, water requirements of crops, and time and frequency of irrigation, but also the feasibility of suitable cropping pattern which can balance the demand for water to its available supply. Since the ayacuts of tanks in the State are fixed and the cropping pattern is more or less traditional based on past experience, the production of crops is mainly governed by the abundance or scarcity of water supply. Paddy is a major crop under irrigation and on account of its high consumption of water, being

as much as 72 inches for a medium duration crop, puts high strain on the demand for water scarcely available in the tanks. In spite of the high water requirements of paddy, little attention is being paid to the utilization of water, and depending upon the season more water is consumed when the supply is favourable, but its consumption is restricted in unfavourable circumstances of shortage of water supply. The cropping pattern is thus governed more by the availability of water rather than the actual needs of the crop. Exigencies of conditions obtaining under the tank system of irrigation demand that water should be utilized in the right amount, in the right place, and at the right time in accordance with the water needs of crops. The cropping pattern should include such crops as require relatively lesser quantity of water but are calculated to yield profits almost on equal terms with paddy.

5. Since the system of paying for irrigation water from the tanks is based on the acre per season unlike the system of tube-well irrigation in the North where charges for water are based on the actual quantity used, the ayacutdars do not feel inclined, much less stimulated, to effect economy in the use of water from the tanks. The practice of charging on an acre basis is an important factor contributing to the wastage of water and although it is difficult to introduce the system of measured distribution, still the irrigation efficiency can definitely be improved by enlightening the cultivators with the different aspects and methods of water utilization.

6. Crop yields per acre of some crops in Andhra Pradesh compare very favourably with the corresponding all-India average (Appendix XII). The average per acre yield of rice and bajra crops are about 30 to 40 per cent higher. In fact, Andhra Pradesh by virtue of its high production of rice is considered as the "rice bowl" of India. The per acre yields of jowar and ragi crops are, however, almost at par but in respect of wheat, maize and cotton, the per acre yields are far below the all-India averages. Considerations of agro-climatic differences apart, the low yields of wheat, maize and cotton may be attributed to lack of adequate attention being given to increase and maintain the level of soil fertility in lands put under these crops. Results of experiments conducted by the State Department of Agriculture during the past years have amply shown that the soils responded very favourably to the application of farm yard manure. Since the quantity of compost and F.Y.M. presently available is hardly adequate to meet the full requirements of cultivated area in the State, the only recourse to replenish the soil fertility is the wide adoption of green manuring practice in conjunction with the judicious use of artificial fertilizers. The addition of organic matter, through green manuring, helps in not only building up the soil fertility but also in enhancing the drainage capacity of hard soils and moisture-retentive capacity of light soils.

7. Apart from green manuring, inclusion of legumes in crop rotations can also help in maintaining the fertility of soil. Wherever an assured supply of seasonal or perennial sources of irrigation water exist or are being newly created, the farmers in the South take up primarily to paddy cultivation. In almost all the tanks under case-studies, it was observed that the cultivators were mainly growing paddy, although it was possible to take a crop of green or black gram, peas, sun-hemp etc. conveniently after rice. In well drained light soils, maize could also be grown followed by some green manure or leguminous fodder crops.

8. In Andhra Pradesh, the low rainfall districts of Nalgonda and Hyderabad have been faced with problems of saline and alkaline water from irrigation tanks and wells resulting in failure of rice crop particularly during Tabi season (December to May), even though rice crop has high tolerance for salt contents in the soil. Results of investigations conducted at Rajendranagar Farm to study the effect of salt concentration in irrigation water on the growth and yield of rice have revealed the predominance of sodium salt concentration. Progressive alkalinization of soils in these areas has also been reported. The effect of alkalinity is more pronounced in heavy soils with impeded drainage. During the rainy season the alkaline concentration gets diluted without adversely affecting the rainy season crop. But in the Tabi season, the absence of dilution with rain water coupled with evaporation, increases the salt concentration that proves toxic to plant growth. Consequently, for fear of the lands becoming unproductive, little use is being made on the available irrigation water from tanks, specially for the second crop of paddy. Green manuring and application of superphosphate could be advantageously adopted to counteract the harmful affects of salinity and alkalinity in the soil.

9. The Team observed that although the State Agriculture Department had recommended green manuring as an important part of agricultural practice, yet its adoption by the cultivators could be regarded as only isolatory. This may be due to (*a*) lack of conviction amongst the cultivators of the efficacy of green manuring as an economical method to raise crop yields, (*b*) reluctance on the part of farmers to pay the same water charges for green manure crops as for other normal crops, and (c) non-availability of water at the sowing time of green manure crop.

10. If the suggestion of the Team in regard to the exploitation of sub-soil water, through sinking of wells in and around the tank ayacuts is agreed to and efforts are made to bring home to the cultivators the economics of green manuring, it would not be difficult to introduce green manuring as a general practice for enhancing the level of soil fertility and stepping up yields of crops.

CHAPTER VI

BETTERMENT LEVY AND WATER RATES

1. In the whole of Andhra Pradesh, the levy of water cess on irrigated lands is regulated by the Act No. XXIV of 1956 of Government of Andhra (Appendix VII-A).

2. The water rates in vogue in Andhra Region are those of (old) Madras State and those in Telangana Region are of (old) Hyderabad State. Appendix VII-B gives water rates obtaining in these two regions as also those in the Deccan Region of Bombay for Minor Works. It may be noticed that the rates in Andhra Region are very low. Those in Telangana are somewhat higher than Andhra but still much lower than those in Bombay as is evident from the following comparative rates for some of the similar crops in the three Regions:—

Crop	Rates per Acre in			
	Andhra		Telangana	Bombay
	I Class	II Class		
1	2	3	4	5
1. Wett 1st crop	4·00	3·00	8·76	12·00
2. Dry 1st crop	3·00	2·25	3·00	6·00
3. Dry 2nd crop	2·00	1·50	5·15	8·00
4. Dry 3rd crop (Hot weather)	1·00	0·75	No rates reported	12·00
5. Sugar cane	6·00	4·50	28·12 to 28·28	80·00

These low water rates in Andhra Pradesh evolved in olden times do not seem to have much bearing on the present improvements in farm-outputs, or the monetary returns from the farm produce. In view of the need to increasing the Government revenues for financing the development activities, in which the country is engaged, a thorough review of the prevalent water rates is long over due.

3. The Irrigation and Power Team had already recommended in their Report on Lakkavalli Project, the need for upward revision of Water Rates in Mysore State. Therefore, prevalence of lower water rates continued from olden times, may be endemic with many other States, in addition to Mysore, Madras and Andhra Pradesh. Secondly, persistence of such low water rates for such a long time indicates that the State Governments are not perhaps prepared to face the likely resentment on this account from the users. The Team, therefore, recommends that with a view to enhancing the returns to the Government from irrigation projects, steps may be taken to carry out a detailed study regarding the current water rates charged in the two regions of the State and suggest ways and means to introduce uniform and increased rates on a rational basis prior to formulating the Rules under the Act, referred to above.

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*This rate pertains to Gujarat Region of Bombay.

In this connection reference is invited to the Taxation Enquiry Commission's Report wherein the water rate structure as well as its relation to betterment is discussed.

4. The Betterment Levy is regulated by the Andhra Government's Act No. XXV of 1955 (Appendix XIV) whereby the maximum amount of Betterment Levy is limited to half the increment in the land value on account of the new project, or expansion of or alternations in an old work. Rules under the Act have so far not been formed and the Team recommends early formulation and implementation thereof.

A.N. KHOSLA
LEADER

29th March, 1960.

SUMMARY

The Team recommends that the Master Plan for restoring old tanks in Andhra Pradesh be implemented and completed during the Third Five Year Plan. The Team suggests that the following steps be taken to expedite and systematise restoration works:—

(*i*) The desirability of having a Special Survey Circle for Andhra Region may be considered so as to expedite the work of restoration of tanks;

(*ii*) Standards for the 13,000 tanks taken over from the ex-Zamindars should be drawn out on modern principles;

(*iii*) The capacity lost due to silting should be recovered by raising the bunds and waste-weirs. The Desilting-*cum*-Reclamation Scheme as evolved by the Madras State may be adopted wherever feasible, to reduce submergence; and

(*iv*) Cultivation in the fore-shores should be regulated to minimise silting up.

The Team also recommends speedy research in measures to be taken to minimise evaporation losses, and checking weed-growths in the tank bed.

2. In order to achieve uniformity and efficiency in maintenance of tanks in Andhra Pradesh, taking into account the new Panchayat System, the Team recommends that:—

(*a*) The Revenue Department may maintain tanks with ayacut from 50 to 200 acres;

(*d*) All tanks below 50 acres may be maintained by the Panchayats;

(*c*) Maintenance of other tanks may be progressively transferred to the Panchayats when they build up sufficient efficiency and experience; and

(*d*) Regular maintenance levy may be imposed on the lands irrigated by each tank.

In order to ensure proper routine maintenance, the Team recommends a certain minimum annual grant for each tank in addition to special grants for repairs when necessary.

3. The Team suggests grouping up of a number of small and scattered repair works in the vicinity totalling to about Rs. 50,000 and giving them to bigger contractors, who would then be in a better position to execute the works at reasonable rates, when other agencies are not forthcoming to execute the repair works.

4. With regard to design practices, the Team points out that:—

(*a*) With a view to minimise the incidence in silting up of channels from diversion weirs, adequate provision of scour sluices near the canal take-off is necessary. Also, wherever feasible, piers and gates may be preferred to solid weirs;

(*b*) Adequate surplussing capacities need to be provided so as to avoid frequent breaching of tanks. Tank slopes on the water-side, also, need to be not less than 2:1 whereas they could be 1½:1 on the rearside.; and

(*c*) The Madras Specification No. 20-A, providing for consolidation and tamping, be applied to all bank-work of tank bunds.

5. *The Team recommends the following measures to accelerate lift irrigation by* pump-sets:—

(*a*) Encouraging Diesel-pump-sets until rural electrification is developed by suitably *relaxing the criterion that the applicant should* possess land worth at least double the loan amount, which is rather too harsh and deters the cultivators from the venture. Loan advances may also be based on the potential of the land rather than on the land assessment, which is normally conservative; and

(*b*) Encouraging co-operative lift schemes which would enable small farmers to get the benefit of such schemes as a result and publicising the details of successful co-operative lift irrigation schemes so as to popularise the same.

6. The Team suggests that drainage water from upper irrigation ayacut may be picked up by means of *diversion weirs and channels to further irrigation*, preferably on a co-operative basis, with adequate Government help in the form of loans.

7. Economic returns as also yield per acre from non-paddy crops are in no way less than those from paddy. Therefore, the Team recommends raising of non-paddy crops. Such a re-orientation in the cropping pattern will result *in* (*a*) *higher incomes to the cultivators and greater revenues* to the State; (*b*) bringing additional areas under cultivation thereby augmenting food production; (*c*) lessening the chances of water-logging; and (*d*) more balanced diet. At present non-availability of water for Rabi crops is mainly due to increased emphasis on cultivation of paddy which consumes *majority of the water stored in the tanks.* Rice cultivation should, therefore, be confined to those areas only where its production potential is high. The remaining areas should be put under other crops needing less water. Also, water required for Rabi crops should be obtained by resorting to intensive lift-irrigation.

8. The Team recommends (*i*) preservation of soil-fertitlity by increased use of green and artificial manure and rotation of crops, and (*ii*) application of super-phosphates for counteracting harmful effects of salinity and alkalinity *in the soil, particularly in the low rainfall areas of* Nalgonda and Hyderabad Districts.

9. It is recommended that necessary steps may be taken by the State *Authorities to have water channels constructed even by acquiring the* necessary lands from the individual owners, so as to reduce loss of water due to extra evaporation and percolation while passing through the fields.

10. With a view to enhancing the returns to the Government from irrigation works, steps may be taken to carry out a detailed study regarding the current water rates. The Team points out the large scope for upward revision of water rates and recommends introduction of uniform and increased rates on a rational basis, in accordance with the recommendations of the 'Taxation Enquiry Commission'. The Team also recommends implemenation of the Betterment Act.

APPENDICES

I Terms of Reference.
II-A District-wise Rainfall in Andhra Pradesh.
-B District-wise Land Utilization in Andhra Pradesh.
III-A District-wise Irrigation in Andhra Pradesh.
-B District-wise number of Tanks and Ayacuts in Andhra Pradesh.
IV Technical Note of the Chief Engineer (General).
V Contemplated Desilting-cum-Reclamation Scheme on six Tanks.
VI Case-studies on 20 Tanks selected at random—Engineering Aspects.
VII Madras Compulsory Labour (Khudi Marammat) Act—1858.
VIII-A-B-C Government of Andhra Pradesh orders delegating special powers for execution of Minor Irrigation Works.
IX Case-Studies of 23 Tanks—Agricultural Aspects.
-A Tabular.
-B Descriptive.
X Evaporation losses.
XI Per Acre net returns for different crops.
XII Per Acre net yields for different crops.
XIII-A Government of Andhra's Act No. XXIV regarding Water Cess—1955.
-B Water Rates in Madras, Hyderabad and Bombay States.
XIV Government of Andhra's Act No. XV regarding Betterment Levy— 1955.
XV Record of discussions held at Hyderabad with the P.W.D. and Agricultural Officers of Andhra Pradesh on 23-2-1960.
XVI Statement showing Observations and Recommendations of the Minor Irrigation Team along with Comments of the Government of Andhra Pradesh and the Ministry of Food and Agriculture, Government of India.

APPENDIX I

No. COPP/(4)/17/58
Reserve Bank Building,
Parliament Street.
New Delhi August 4, 1958.

FROM,

Shri Indarjit Singh,
Joint Secretary, Finance
and Secretary, COPP.

TO,

The Chief Secretary,
Government of Madras, Madras/Andhra Pradesh, Hyderabad/Mysore, Bangalore/Kerala, Trivandrum/Punjab, Chandigarh/Uttar Pradesh, Lucknow

SUBJECT:—*Team for the Sudy of Minor Irrigation Projects.*

SIR,

I am directed to forward a copy of the Terms of Reference of the Minor Irrigation Team set up by the Committee on Plan Projects. The Team will conduct studies in accordance with these Terms of Reference in your State. *(In order to enable the Secretary of the Team to get in touch with the relevant authorities in the State, it is suggested that a liaison officer may be appointed for this purpose with whom he could maintain contact for such arrangements and facilities as may be necessary for this study).

2. The Composition of the Team will be as follows:—

1. Shri N. V. Gadgil	Leader
2. Shri M. Narasimhaiya	Member
3. Shri Lal Singh	Member
4. Irrigation Adviser to the Government of India.	Member ex-officio.
5. Shri D. S. Borker	Secretary

3. The Team has been instructed to associate the local officers with its work. The Leader of the Team will contact the State Government for the name of the official or officials who should be associated with the Team.

YOURS FAITHFULLY

INDARJIT SINGH,
Joint Secretary, Finance and
Secretary, COPP.

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*For U.P. & Punjab only

TERMS OF REFERENCE OF THE MINOR IRRIGATION TEAM

The minor rrigation projects may be divide or study into two parts:—

(*a*) Works already in existence.

(*b*) Works which are now be constructed.

2. Case studies should be made of a number of projects of each type under the above headings with a view to judging their efficiency having regard to the objectives with which such works were carried out.

3. The following points should be especially borne in mind:—

Existing Projects:

(*i*) The present state of repair and maintenance.

(*ii*) The system of keeping works in proper maintenance with particular reference to the customary obligations of villagers for keeping such works in a sound conditions from year to year, the Team should also examine the extent to which these obligations are enforced, the reasons for the failure to do so and the steps that should be taken to carry out such obligations efficiently.

(*iii*) Reasons, if any for non-utilisation of water by cultivators.

(*iv*) Improvements necessary to make the projects more efficient either in the matter of better agricultural planning and practices or in respect of engineering works.

(*v*) Cost of restoration if the project is in a state of disrepair and whether it has been included in the Plan.

New Projects:

(*i*) Methods of selection—procedure and principles on which priorities are based.

(*ii*) Flow Chart of the construction Project should be prepared to examine whether any avoidable delay has occurred in its completion.

(*iii*) Whether fullest use is made of catchment capacity in preparing designs.

(*iv*) Economics of design.

(*v*) State of agricultural planning with a view to optimum utilisation of benefits.

(*vi*) Institutional arrangements provided for the proper maintenance of new works with special reference to the customary obligation of villagers in this regard.

(*vii*) Costs of actual construction compared to estimated cost—the reason for increase, if any, and the care with which the initial estimates were framed.

4. Any other matter which the Team considers necessary to report upon having a bearing on economy and efficiency of such projects.

5. The following information should be gathered by the Team for each State, taken as a whole, in regard to existing minor irrigation works:—

(*i*) The total area irrigated from them according to Settlement registers.

(*ii*) The area actually irrigated from year to year beginning from 1947.

(*iii*) The reason for the reduction, if any, in the area irrigated.

6. In addition, the Team will carry out a study of the tube-well schemes of the Punjab and the U.P. with reference to the fact whether optimum use has been made of the facilities available by ensuring scientific crop planning and by improving agricultural practices. The study should be based on an examination of individual tube-wells, which may be divided into most successful, successful and least successful varities for the purposes of study. The Team should also select a few tube-wells for which alternative crop planning and practices may be recommended that are being carried out at present in order to make them more successful. The consideration mentioned regarding minor irrigation works in paragraph 3 *mutatis mutandis* be taken into consideration for the study of tubewells also.

APPENDIX II—A

Average annnal rainfall : By Districts 1949-50 *to* 1955-56.*

Sl. No.	Districts	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56
1	2	3	4	5	6	7	8	9
Andhra Region								
1.	Anantapur ..	24·80	21·70	15·00	15·80	28·10	21·10	24·90
2.	Chittoor	33·00	29·20	24·60	29·50	37·00	41·50	28·00
3.	Cuddapah ..	28·10	19·70	21·00	20·00	29·80	35·20	30·60
4.	East Godavari ..	53·90	50·80	45·20	30·10	35·20	52·40	42·40
5.	Guntur	41·50	27·00	26·80	20·60	31·10	38·60	33·70
6.	Krishna	45·70	34·20	35·20	24·00	33·70	46·70	45·10
7.	Kurnool ..	33·70	22·70	31·60	14·70	20·70	25·20	31·60
8.	Nellore	32·10	32·50	32·60	24·10	38·30	44·70	21·60
9.	Srikakulam ..	N.A.	38·70	41·80	39·20	46·90	46·30	58·80
10.	Visakhapatnam	48·50	35·10	41·50	38·10	37·10	59·00	48·70
11.	West Godavari	53·70	46·90	41·50	28·60	41·20	53·60	46·50
	Average ..	39·50	32·59	32·44	25·88	35·28	42·21	37·45
Telangana Region								
12.	Adilabad ..	53·45	26·54	33·52	28·64	53·83	39·81	31·90
13.	Hyderabad ..	24·85	33·88	26·95	16·77	31·46	27·23	43·70
14.	Karimnagar ..	37·31	29·35	32·05	26·35	45·29	32·27	40·90
15.	Khammam	Not Available				6·67	40·75	45·80
16.	Mahboobnagar	33·65	27·22	30·22	19·47	32·76	30·92	57·60
17.	Medak ..	37·65	29·18	29·92	23·02	39·92	36·52	60·60
18.	Nalgonda ..	28·12	27·99	43·41	19·16	31·17	32·46	50·10
19.	Nizamabad ..	45·14	31·22	40·14	24·44	54·91	36·79	41·00
20.	Warangal ..	41·25	35·37	36·32	25·90	45·15	37·57	53·90
	Average ..	37·68	29·97	31·57	22·97	37·91	34·92	47·20
Andhra Pradesh	Inches	38·69	31·49	32·07	24·66	36·46	38·93	41·90
	Millimeters	982·73	799·85	814·58	626·36	926·08	988·82	1064·26

*Vide "Statistical Abstract"—Andhra Pradesh, 1956.

APPENDIX II-B

Statement of Land Utilisation for the Year 1955-56

(in thousand acres)

Sl. No.	District	Forests	Barren and un-cultivated	Land put to non-agricultural uses	Cultivable waste	Permanent pastures	Miscell-aneous : trees, crops & groves not included in Net Area sown	Current fallows	Fallow land other than current fallows	Net Area sown	Geographical Area by village records
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	I. Andhra Region										
1.	Anantapur	483	414	270	422	27	32	281	230	2,571	4,728
2.	Chittoor	1,197	418	150	364	81	65	415	119	960	3,769
3.	Cuddapah	1,157	161	204	660	142	21	350	29	1,076	3,799
4.	East Godavari ..	1,393	232	186	404	139	50	65	52	1,116	3,637
5.	Guntur	469	375	43	110	95	75	309	57	2,161	3,694
6.	Krishna	225	320	87	64	47	61	101	24	1,309	2,237
7.	Kurnool	1,694	296	134	475	25	10	221	113	2,926	5,895
8.	Nellore	408	1,726	346	218	377	50	272	90	1,607	5,094
9.	Srikakulam	434	453	69	216	94	175	24	102	925	2,491
10.	Visakhapatnam	1,446	376	368	74	35	42	145	44	784	3,314
11.	West Godavari	118	220	164	229	68	8	103	65	957	1,932
	TOTAL I	9,024	4,991	2,021	3,235	1,130	437	2,438	924	16,390	40,590
	II. *Telangana Region*										
12.	Adilabad	1,039	471	142	188	147	13	233	86	1,261	3,580
13.	Hyderabad	169	179	125	59	192	23	205	56	858	1,867
14.	Karimnagar	644	206	180	85	161	20	288	57	1,288	2,928
15.	Khamam	1,189	185	125	101	173	8	84	50	864	2,779
16.	Mahboobnagar	786	282	164	85	198	28	391	130	2,496	4,560
17.	Medak	220	224	136	101	228	46	315	144	1,092	2,505
18.	Nalgonda	236	257	146	84	301	12	425	127	1,833	3,421
19.	Nizamabad	360	180	147	100	141	17	194	74	696	1,908
20.	Warangal	325	272	153	81	221	26	261	81	1,120	2,542
	TOTAL II ..	4,968	2,255	1,317	884	1,762	194	2,396	805	11,508	26,091
	GRAND TOTAL	13,992	7,246	3,338	4,119	2,892	631	4,834	1,720	27,898	66,681
	Percentage of TOTAL AREA ..	21·0	10·9	5·0	6·2	4·4	0·9	7·2	2·6	41·8	100·0

APPENDIX III-A

Statement of Irrigation Development for the Year 1955-56

(in acres)

Sl. No.	District	Area in sq. miles	CANALS				Tanks	
			Govt.		Private			
			No.	Area irrigated	No.	Area irrigated	No.	Area irrigated
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	I. Andhra Region							
1.	Anantapur	7,387	3,385	45,193	166	663	2,237	91,273
2.	Chittoor	5,931	578	8,319	16	151	6,626	1,76,460
3.	Cuddapah	5,923	405	66,349	6	760	1,184	73,025
4.	East Godavari	5,768	11	4,74,102	—	—	1,196	1,33,594
5.	Guntur	5,795	14	4,49,335	—	—	285	45,166
6.	Krishna	3,496	11	6,38,991	—	—	600	1,17,784
7.	Kurnool	9,275	244	53,664	2	779	518	59,956
8.	Nellore	7,942	19	2,51,490	—	—	522	3,09,034
9.	Srikakulam	3,902	79	1,65,717	17	13,287	9,316	2,77,692
10.	Visakhapatnam	5,201	87	79,940	8	41,519	2,618	1,35,567
11.	West Godavari	2,988	169	6,18,459	—	—	445	1,13,966
	Total I	63,608	4,998	28,51,559	215	57,159	25,547	15,33,517
	II. Telangana Region							
12.	Adilabad	6,242	N.A.	7,791	N.A.	—	N.A.	44,382
13.	Hyderabad	2,904	N.A.	9.090	N.A.	740	N.A.	47,384
14.	Karimnagar	4,504	N.A.	30,568	N.A.	1,932	N.A.	1,92,245
15.	Khammam	4,232	N.A.	27,930	N.A.	205	N.A.	90,222
16.	Mahboobnagar	6,833	N.A.	13,947	N.A.	772	N.A.	1,66,966
17.	Medak	3,804	N.A.	12,613	N.A.	106	N.A.	1,46,244
18.	Nalgonda	5,385	N.A.	32,127	N.A.	1,130	N.A.	1,10,441
19.	Nizamabad	3,203	N.A.	1,28,606	N.A.	741	N.A.	1,07,449
20.	Warangal	5,326	N.A.	14,393	N.A.	786	N.A.	1,99,786
	Total II	42,433	N.A.	2,77,065	N.A.	6,412	32,980	11,05,119
	Grand Total	1,06,041		31,28,624		63,571	58,527	26,38,636
	Percentage of total area			46·1		0·9		38·9

Note:—N.A. = Figures not available,

APPENDIX III-A—*contd.*

Sl. No.	District	Wells: No.	Wells: Area irrigated	Other sources (spring channels etc.)	Total irrigated area	Area irrigated more than once	Gross area irsigated
(1)	(2)	(10)	(11)	(12)	(13)	(14)	(15)
	I. Andhra Region						
1.	Anantapur	58,448	65,197	8,600	2,10,926	97,946	3,08,872
2.	Chittoor	74,451	1,00,608	31,662	3,17,200	94,668	4,11,868
3.	Cuddapah	34,430	76,415	11,775	2,28,324	64,544	2,92,868
4.	East Godavari	1 400	301	7,819	6,15,816	94,267	7,10,083
5.	Guntur	3,073	10,600	8,854	5,13,955	13,594	5,27,549
6.	Krishna	3,261	5,152	4,940	7,66,867	68,299	8,35,166
7.	Kurnool	12,994	10,589	30,113	1,54,322	2,417	1,56,739
8.	Nellore	10,601	70,974	11,941	6,44,218	1,93,539	8,37,757
9.	Srikakulam	8,930	25,367	20,328	5,02,391	55,659	5,58,050
10.	Visakhapatnam	16,052	40,706	55,756	3,53,488	51,941	4,05,429
11.	West Godavari	366	10,251	14,147	7,56,823	57,911	8,14,734
	TOTAL I	2,22,956	4,16,160	2,05,935	50,64,330	7,94,785	58,59,115
	II. Telangana Region						
12.	Adilabad	N.A.	1,379	1,744	55,296	15,491	70,787
13.	Hyderabad	N.A.	45,330	5,630	1,08,174	13,560	1,21,734
14.	Karimnagar	N.A.	37,484	19,806	2,82,035	44,762	3,26,797
15.	Khammam	N.A.	9,776	1,409	1,29,542	3,987	1,33,529
16.	Mahboobnagar	N.A.	41,492	7,495	2,30,672	23,449	2,54,121
17.	Medak	N.A.	37,604	3,606	2,00,173	41,175	2,41,348
18.	Nalgonda	N.A.	56,607	3,628	2,03,933	89,897	2,93,830
19.	Nizamabad	N.A.	15,246	2,340	2,54,382	47,677	3,02,059
20.	Warangal	N.A.	41,837	2,601	2,59,403	44,434	3,03,837
	TOTAL II	N.A.	2,86,755	48,259	17,23,610	3,24,432	20,48,042
	GRAND TOTAL		7,02,915	2,54,194	67,87,940	11,19,217	79,07,157
	PERCENTAGE OF TOTAL AREA		10·3	3·8	100·00	16·5	116·5

APPENDIX III-B

Districtwise distribution of tanks and area irrigated in 1955-56

Sl No.	Name of District	Below 10 acres	11-50 acres	51-100 acres	101-200 acres	Above 200 acres	Total No.* of tanks	Settled* ayacut under the tank	Actual irrigation under tank during 1955-56 (acres)	Gap columns (9-10) (acres)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	TELANGANA REGION									
1.	Warangal	1,585	1,594	633	317	228	4,357	2,21,784	199,786	21,998
2.	Khammam	531	798	210	97	66	1,702	93,186	90,222	2,964
3.	Karimnagar	3,080	2,827	648	263	176	6,994	269,554	1,92,554	77,309
4.	Adilabad	335	568	130	254	34	1,161	42,760	44,382	—
5.	Nalgonda	1,599	1,409	617	215	114	3,954	1,25,460	1,10,441	15,019
6.	Medak	2,817	2,605	910	544	64	6,940	1,93,395	1,93,628	67,473
7.	Hyderabad	498	1,211	306	149	10	2,174	61,706		
8.	Nazamabad	300	547	304	162	102	1,415	1,09,863	1,07,449	2,414
9.	Mahboobnagar	1,653	1,660	534	277	159	4,283	1,83,280	1,66,966	16,314
	TOTAL	12,438	13,219	4,292	2,078	935	32,980	13,00,988	11,05,119	1,97,791
	ANDHRA REGION									
10.	Srikakulam		7,324		1,914	78	9,316	2,44,950	2,77,692	—
11.	Visakhapatnam		2,394		118	106	2,618	3,25,420	1,35,567	189,853
12.	East Godavari		627		520	49	1,196	—	1,33,594	—
12.	West Godavari		302		116	27	445	4,13,561	2,31,750	181,811
14.	Krishna		456		107	37	600			
15.	Guntur		179		98	8	285	1,39,770	45,166	94,604
16.	Nellore		238		69	215	522	2,42,146	3,09,034	—
17.	Kurnool		426		51	41	518	49,284	59,956	—
18.	Anantapur		1,497		628	112	2,237	1,08,305	91,273	17,032
19.	Cuddapah		1,029		106	49	1,184	31,580	73,025	—
20.	Chittoor		5,290		1,307	29	6,626	1,30,882	1,76,460	
	TOTAL	—	19,762	—	5,034	751	25,547	16,85,898	15,33,517	4,83,300
	GRAND TOTAL	—	49,711	—	7,112	1,704	58,527	29,86,886	26,38,636	6,82,091

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* *Vide* Master Plan for restoration of tanks in Andhra Pradesh.

APPENDIX IV

NOTE OF MASTER PLAN FOR RESTORATION OF TANKS IN ANDHRA PRADESH RECEIVED FROM THE CHIEF ENGINEER, IRRIGATION ON 15-4-1960

1. *General Aspects*

The geographical area of Andhra Pradesh is 66.6 million acres. 42% of this area (*i.e.* 27.9 million acres) is under cultivation at present and 16% (*i.e.* 10.7 million acres) is lying fallow. Out of 27.9 million acres of cultivated land, 6.788 million acres are being irrigated as per the sources given below, as on 1-4-1956 (*i.e.* the end of the First Five Year Plan.)

	Lakh Acres
(*a*) Government canals	31·28
(*b*) Private canals	0·63
(*c*) Tanks	26·38
(*d*) Wells	6·98
(*e*) Other sources such as spring channels from streams etc. ..	2·61
TOTAL ..	67·88

Thus roughly 47% is irrigated under Major Irrigation Canals and 53% under Minor Irrigation sources.

2. As seen above, the total area irrigated under tanks in the whole State is 26.38 lakhs acres which is served by 25,547 tanks in Andhra region and 32,980 tanks in Telangana region the total No. of tanks being 58,527 nos. In almost all tanks the crop raised is mostly paddy, 10% of the total number of tanks are likely to be benefited by the Major Projects of Nagarjunasagar and Siddeswaram Projects on river Krishna and the Pochampadu Inchampalli and Ippur Project on river Godavari.

3. Most of the tanks are under State control in the Andhra region; tanks with an ayacut of 200 acres or more are looked after by P.W.D. and the smaller tanks with ayacuts less than 200 acres are looked after by the Revenue Department through the Minor Irrigation staff under the control of the Collector in each District. In Telangana all tanks above 100 acres ayacut are looked after by the ryots under the supervision of the Revenue Department.

Tanks in Andhra Region

Out of a total of 25,547 tanks in Andhra region, about 9,903 tanks have been brought to P.W.D. standard. For the rest, surveys have to be done and standards fixed and tanks brought to P.W.D. standards. Most of these tanks are taken over by Government from ex-Zamindari in 1950 and are in a very neglected condition. There is no recorded evidence to show when these tanks were formed and what their original standards were.

5. Therefore the task on hand with the P.W.D. is to restore all these tanks by systematic surveys and fixation of standards to bring them into highest state of efficiency. In Andhra area, in Srikakulam and Vizag Districts, these surveys of erstwhile Zamindari tanks are already taken up

for investigation by an Executive Engineer, and in other districts, the regular P.W.D. Staff are attending to the same. In Telangana area there is a separate Circle under Superintending Engineer for investigation and survey of Minor Irrigation tanks.

6. Tanks in Andhra area are repaired as and when circumstances warrant in addition to prompt attention being regularly given to attend to flood damage repairs to breached tanks. Taking the irrigable capacity of minor basins based on normal rainfall flows, 88% of the registered ayacut has been cultivated. The 12% gap is due to neglect in maintenance and repairs for want of funds to attend to timely repairs. In most cases it is found that the customary repair work to be done by ryots (*i.e.* Khudi Marammat works) has been neglected.

7. The gap between the registered ayacut and actual area cultivated may be as much as 6.81 lakhs acres. To this extent, it is possible to bridge this gap by improving the existing tanks with its irrigation works and by restoring the abandoned tanks. The approximate ,cost of improvements is Rs. 16 crores.

8. The master plan for restoration of tanks in Andhra Pradesh, as shown in the statement at pages 38–39, consists of (1) Bringing up the unrestored tanks to P.W.D. Standards and (2) Bridging up the gap in irrigation between settled ayacut and actual irrigation.

9. The total amount required for the above purpose works out to Rs. 5.00 crores for Telangana and Rs. 11.00 crores for Andhra region. Against these requirements, the provision made for minor irrigation schemes under Second Five Year Plan for Telangana and Andhra regions, are Rs. 164.36 lakhs and Rs. 70.00 lakhs respectively . As such, a further amount of Rs. 13.66 or (Rs. 14.00 crores) is required for the restoration of all the tanks in Andhra Pradesh during the Third and subsequent Plans.

Master Plan for Restoration of tanks in Andhra Pradesh

Sl. No.	Name of District	No. of existing tanks: Below 10 acres	10—50 acres	50—100 acres	100—200 acres	Above 200 acres	Total No. of tanks	Settled ayacut under the tank	No. of tanks restored
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	I. Telangana Region								
1.	Warangal	1,585	1,594	633	317	228	4,357	2,21,784	1,384
2.	Khammam	531	798	210	97	66	1,702	93,186	463
3.	Karimnagar	3,080	2,827	648	263	176	6,994	2,69,554	1,063
4.	Adilabad	355	568	130	54	34	1,161	42,760	229
5.	Nalgonda	1,599	1,409	617	215	114	3,954	1,25,460	779
6.	Medak	2,817	2,605	910	544	64	6,940	1,93,395	714
7.	Hyderabad	498	1,211	306	149	10	2,174	61,706	
8.	Nizamabad	300	547	304	162	102	1,415	1,09,863	586
9.	Mahboobnagar	1,653	1,660	534	277	159	4,283	1,83,280	854
	TOTAL	12,438	13,219	4,292	2,078	953	32,980	13,00,988	6,072
	II. Andhra Pradesh								
10.	Srikakulam		7,324		1,914	78	9,316	2,44,950	1,267
11.	Visakhapatnam		2,394		118	106	2,618	3,25,420	590
12.	East Godavari		627		520	49	1,196	—	1,191
13.	West Godavari		302		116	27	445	4,13,561	181
14.	Krishna		456		107	37	600		
15.	Guntur		179		98	8	285	1,39,770	208
16.	Nellore		238		69	215	522	2,42,146	357
17.	Kurnool		426		51	41	518	49,284	425
18.	Anantapur		1,497		628	112	2,237	1,08,305	766
19.	Cuddapah		1,029		106	49	1,184	31,580	1,184
20.	Chittoor		5,290		1,307	29	6,626	1,30,882	3,734
	TOTAL		19,762		5,034	751	25,547	16,85,898	9,903
	GRAND TOTAL		49,711		7,112	1,704	58,527	29,86,886	15,975

Master Plan for Restoration of tanks in Andhra Pradesh(contd)

Sl. No.	Name of District	Ayacut under the tanks restored	No. of tanks to be restored	Tanks to be restored: Irrigation under unrestored tanks	Tanks to be restored: Cost of restoring the tanks to PWD Standard at Rs. 50 per acre in Rs. lakhs	Actual irrigation under tanks during 1955-56	Gap	Cost on gap at Rs. 160 per acre in Rs. lakhs	Total cost in Rs lakhs cols. (14+17)
(1)	(2)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	I. Telangana Region								
1.	Warangal	1,85 108	2,973	14,678	7·34	1,99,786	21,998	33·00	40·34
2.	Khammam	81,987	1,239	8,235	4·12	90,222	2,964	4·45	8·57
3.	Karimnagar	1,33,500	5,931	58,745	29·37	1,92,245	77,309	115·96	145·33
4.	Adilabad	18,303	932	26,079	13·04	44,382	—	—	13·04
5.	Nalgonda	88,590	3,175	21,851	10·93	1,10,441	15,019	22·53	23·46
6.	Medak	88,478	8,400	1,05,150	52·58	1,93,628	61,473	92·21	144·79
7.	Hyderabad								
8.	Nizamabad	69,161	829	38,288	19·14	1,07,449	2,414	3·62	22·76
9.	Mahboobnagar	76,673	3,429	90,293	45·15	1,66,966	16,314	24·47	69·62
	TOTAL	7,41,800	26,908	3,63,319	181·67	1,105,119	1,97,791	296·24	477·91 (or 5·00 crores)
	II. Andhra Pradesh								
10.	Srikakulam	73,613	8,049	2,04,079	102·04	2,77,692	—	—	102·04
11.	Visakhapatnam	57,929	2,028	77,638	38·82	1,35,567	1,89,853	284·78	323·60
12.	East Godavari	85,727	5	47,867	23·93	1,33,594	—	—	23·93
13.	West Godavari	75,552	864	1,76,198	88·10	2,31,750	1,81,811	272·72	360·82
14.	Krishna								
15.	Guntur	29,950	77	15,216	7·61	45,166	94,604	141·91	149·52
16.	Nellore	1,38,367	165	1,70,667	85·33	3,09,034	—	—	85·33
17.	Kurnool	51,356	93	8,600	4·30	59,956	—	—	4·30
18.	Anantapur	1,37,202	1,471	—	—	91,273	17,032	25·55	25·55
19.	Cuddapah	93,276	—	—	—	73,025	—	—	—
20.	Chittoor	1,00,115	2,892	76,345	38·17	1,76,460	—	—	38·17
	TOTAL	8,43,087	15,644	7,76,610	388·30	1,53,3517	4,83,300	724·96	1113·96 (or 11 crores.)
	GRAND TOTAL	15,84,887	42,552	11,39,929	569·97 lakhs	26,38,636	6,81,091	1,021·20 lakhs	16·00 crores

CHIEF ENGINEER, IRRIGATION.

APPENDIX V

Office of the Chief Engineer,
Irrign., (Andhra Pradesh)
Hyderabad (Dn).

D. O. Letter No. L-1/75230/59LW. D/16-3-1960

My dear Borker,

SUBJECT—Desilting-cum-Reclamation Schemes.

REFERENCE—Your D.O. Letter No. COPP/I&P/28/33/59/2083, dated 12-1-59.
Your D.O. Letter No. COPP/I&P/28/59/2325 dated 22-12-59

I read with interest the copies of the reports in Minor Irrigation works in Madras State and in Mysore State. In my opinion it appears to me that the schemes are workable only where we can get a very high price for the land reclaimed usually near towns in deltaic areas etc. It has been decided to take a few tanks as an experimental measure for trying this scheme, three in Telangana and three in Andhra, names of which are given in the statement attached. It is only after watching the results of this experiment that any considered opinion can be formed as to what extent the scheme is worth pursuing and if the Madras type of scheme or the Mysore type of scheme is preferable to try.

I have consulted Shri A.R. Venkataraman, Chief Engineer, Irrigation on this and he is in full agreement with me.

With best wishes,

Yours sincerely

J.C. HARIDKAR

Shri D.S. Borker,
Secretary, Consultative Committee,
Irrigation and Power Projects,
Krishi Bhavan, Queen Victoria Road,
New Delhi.

Sl. No.	Name of tank	Area of ayacut	Area of submergence	Ratio of 4 : 3
1	2	3	4	5
Andhra Region				
1.	Chemarru Circar Cheroo, Guntur Dist. Sattanapalli Taluk.	62—0	164—0	2·65
2.	Tadkanapally Tank (old) Ramallakara Taluk, Karnool Dist	75—0	243—0	3·24
3.	Hanumani Cheroo Gooty Taluk, Anantapur Dist.	31—0	89—0	2·87
Telangana Region				
1.	Rajacheroo, Pampur Wanaparthy Taluk, Mahboobnagar Dist.	10—10	88—10	3·18
2.	Pedda Cheroo Mothku, Ramannapet Taluk, Nalgonda Dist.	115—31	133—8	1·16
3.	Ramappa Cheroo, Telcunta, Sultanabad Taluk, Karimnagar Dist.	315—8	361—0	1·15

APPENDIX VI

Results of Case Studies on Twenty Selected Tanks

Sl. No.	Name of Tank and District	Ayacut Acres Regd.	Ayacut Acres Actual	Agency maintaning Tank	Present condition of Bund	Present condition of Revetment	Present condition of Sluices
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	I—ANDHRA REGION						
	Guntur Dist.						
1.	Konidena Sircar Cheruvu	144	144	Revenue Deptt.	Scoured, full of of anthills & rat-holes.	Loose & scattered.	In working condition.
2.	Lakshmi Guruvaiah Cheruvu ..	24	24	Do.	Scoured at many places. No gravel casing.	Good	V. Good
3.	Bhavanasi Tank System	919	1,100 to 1,300	PWD	V. Good	V. Good	V. Good
	Kurnool Dist.						
4.	Markapur Tank System	1151	1,200	PWD	Good	V. Good	V. Good
5.	Cumbum Tank System	6,458	10,000	PWD	V. Good	V. Good	V. Good
	Krishna Distt.						
6.	Sher Mohd Pet Tank	429	429	PWD	Slopes suprastandard.	Loose, displaced & dragged down in the last rainy season.	V. Good
7.	Jaggayyapet Tank	187	250	PWD	Extreme left cracked, scoured & full of rat-holes.	Disturbed but settled.	V. Good One rebuilt in 1959.
8.	Paritala Tank	1,044	1,200	PWD	Top cart road. Slopes scoured. Right flank studded with trees.	Completely dislodged & dragged down.	In working condition. One leaky.
9.	Marlapadu Tank	300	300	PWD	Bund scoured and full of Palmyrah & other trees.	Good	Good
10.	Veeravalli Pedda Tank	300	300	PWD	"	Settled but disturbed.	"

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
11.	Nuzvidu Tank	410	410	PWD	Slopes & top eroded near the town.	,,	,,
12.	Advinakkalum Ura Tank	300	300	PWD	All eroded & scoured. (under repairs).	Loose & dragged down.	Leaky—under repairs.
	II—TELANGANA REGION *Nalgonda Dist.*						
13.	Ekvacheroo Vanga-Palli	38·55	38·55	PWD	No gravel casing. Full of palmyrah, pallas & other trees.	V. Good	V. Good
14.	Kothacunta Kolpak	24·75	24·75	PWD	Breached & undulating.	Nil	In working condition.
	Warangal Dist.						
15.	Peddacheroo Pembarthy	256·50	204·725	PWD	Top not level. No gravel casing. Slopes eroded & full of trees.	V. Good	V. Good
16.	Thegalcunta Pedda Pendial	46·975	46·975	PWD	Breached. Slopes full of big trees.	Nil	In working condition.
17.	Sengasanicunta Pedda Pendial ..	90	90	PWD	Breached— cross bunds laid by ryots.	,,	,,
18.	Peddacheroo Komat Palli	171·40	171·40	PWD	Top regular traffic, so eroded. No gravel casing except on flanks. Slopes studded with trees.		V. Good. One new sluice provided & old repaired in 1958.
	Khammam Dist.						
19.	Ooracheroo Kukereni	15·50	15·50	Rev. Dept.	Top regular traffic. Slopes scoured.	Dry rubble revetment.	Two new sluices provided 1958.
20.	Pancheroo Ananthawaram	117·10	117·10	PWD	—	,,	In working condition.

NOTE :—Wherever portion of the tank bed is patta, encroachment invariably exists but it has been reported that it is difficult to assess and control particularly due to the Grow More Food Campaign.

Appendix VI (*contd*)

Sl. No.	Name of Tank and District	Damages, if any				Encroachment on Foreshores, if any	Remarks
		Nature of Damage	Year of Damage	Cost of repairs	Year of repairs		
(1)	(2)	(9)	(10)	(11)	(12)	(13)	(14)
	I—ANDHRA REGION						
	Guntur Dist.						
1.	Konidena Sircar Cheruvu ..	—	—	—	—	—	A very shallow tank containing silt 4 to 5 feet deep.
2.	Lakshmi Guruvaiah Cheruvu	—	—	—	—	—	A very shallow tank containing silt 4 to 5 feet.
3.	Bhavanasi Tank System ..	—	—	—	—	—	Constructed in 1918. Practically no silt.
	Kurnool Dist.						
4.	Markapur Tank System ..	Piping through bund.	1951, 53, 55, 57 and 59.	Not known.	1951, 53, 55, 57 and 59.	—	Contains silt 6 feet deep.
5.	Cumbum Tank System ..	—	—	—	—	—	Constructed in 16th Century: Contains silt 14 feet deep.
	Krishna Dist.						
6.	Sher Mohd Pet Tank ..	Overtopping at 3 places.	1956	Ring bund immediately raised. Repaired in 1957.	1956, 1957	—	Restoration works carried out by P.W.D. in 1959 at a cost of Rs. 8,000.
7.	Jaggayyapet Tank	—	—	—	—	—	Tank repaired and brought to specifications in 1959 at a cost Rs. 4,000.
8.	Paritala Tank	Overtopping, bund breached.	1944, 1952, 1956,	Not known	Immediately by ryots & P.W.D.	Bed mostly patta.	Restoration work being carried out at a cost of Rs. 10,000. Tank mostly silted up.
9.	Marlapadu Tank	„	1949	„	1949-50 (Special repair programme)	Encroachment exists.	Tank included in the repair programme for 1960-61 to bring up to Railway Standards.
10.	Veeravalli Pedda Tank ..	„	„	„	„	„	„
11.	Nuzvidu Tank	„	„	„	„	Nil	Surveyed and estimates at a cost of Rs. 6,000 submitted.
12.	Advinakkalum Ura Tank ..	„	„	„	„	Nil	Maintenance work at a cost of Rs. 8,000, in progress.

(1)	(2)	(9)	(10)		(11)	(12)	(13) (14)
	II—TELANGANA REGION						
	Nalgonda Dist.						
13.	Ekvacheroo Vanga Palli	Overtopping breach in bund.	1949	Not known	1949	—	Being a railway affecting tank, brought to standards in 1959, at a cost of Rs. 11,030. Silt 2 feet deep.
14.	Kothacunta Kolpak ..	,,	1950, 54 & 58.	In 1950 by PWD by pitching (cost not known). Others by ryots.	1950, 54 & 58.	—	Restoration at a cost of Rs. 4,660, sanctioned.
	Warangal Dist.						
15.	Peddacheroo Pembarthy ..	Overtopping	1954	Weir cut by ryots to avoid breach.	1954	Nearly half of bed is patta.	Being a Railway affecting tank, brought to standards in 1956 at a cost of Rs. 8,650. Cut weir reduced to bye-wash.
16.	Thegalcunta Pedda Pendial	,,	Eevery Year	Ring bunds laid by ryots & breaches revetted	Every Year immediately.	Nil	Survey carried out and estimates for restoration for Rs. 13,250 submitted.
17.	Sengasanicunta Pedda Pendial	Breached Tank	Not known	Cross bunds laid by ryots	Not known	Portion of Foreshores Patta-Ayacut of upper tank.	Survey carried out and estimates for restoration submitted. Details not available.
18.	Peddacheroo Komat Palli ..	Piping through bund.	Eevery Year upto 1956.	Repairs carried out by Ryots by stone-pitching.	,,	Nearly 1/3 of bed patta.	Restoration work at a cost of Rs. 11,850 started in 1957 and completed in 1959. Shallow tank mostly silted up.
	Khammam Dist.						
19.	Ooracheroo Kukereni ..	—	—	—	—	Foreshores cultivated by encroachment.	Tank repaired at a cost of Rs. 1,950 in 1958.
20.	Pancheroo Ananthawaram	—	—	—	—		Tank last repaired in 1933. Estimtes for Rs. 6,330 sanctioned for spiral repairs upto Railway specifications.

APPENDIX VII

ACT NO. 1 OF 1858

(THE MADRAS COMPULSORY LABOUR ACT, 1858)

(20th January 1858)

An Act to make lawful compulsory labour for the prevention of mischief by inundation, and to provide for the enforcement of customary labour on certain works of irrigation in the Presidency of Fort Saint George.

Whereas the safety of person and property is endangered by inundations caused by sudden breaches of the embankments of tanks, rivers and canals and of anicuts and other like works; and it is necessary for the common good to make it obligatory on persons, when duly called upon, to unite their labour to prevent such breaches, or to repair them instantly; and whereas it is expedient to make legal provision for the enforcement of the duty, which by local customs is incumbent on village communities, to furnish the labour required for the execution of certain works for the purpose of irrigation and drainage; It is enacted as follows :—

1. Whenever it shall appear to the Officer in charge of any tank, river or canal, or of any anicut or other like work, that there is imminent danger of the embankment of such tank, river or canal being breached, or of a breach being made in such anicut or other work, and of a destructive inundation being caused hereby, which may be prevented by a large body of (Persons) immediately working together to strengthen the embankment or other work, or when such a breach has occurred, if it shall appear to such Officer that it can be repaired, and the inundation caused by it be stopped, by the immediate employment of a large body of (Persons) for that purpose, it shall be lawful for such Officer to require the head or heads of the village or villages in the vicinity to call upon all able-bodied male persons in such village or villages to co—operate in the work necessary for preventing or repairing the breach, as the case may be.

In the absence of the said Officer, it shall be lawful for the Tehsildar of the Taluq to make such requisition in his stead.

And if neither the said Officer nor the Tehsildar is on the spot, and the emergency is great and urgent, it shall be lawful for the head of the village in which the breach is expected to occur or has occurred, of his own motion, to call upon (all able-bodied male persons) of his own village, and, if needful, to make a requisition to the heads of the neighbouring villages to call likewise upon (the able-bodied male persons of their villages), to co-operate in the work necessary for preventing or repairing the breach.

2. Any male person being duly called upon by the head of his village to labour as aforesaid, who shall refuse or neglect to comply with such call without any lawful excuse shall, on conviction before a Magistrate, be punished with a fine which may extend to one hundred rupees, or with simple imprisonment which my extend to one month, or with both.

3. Every person who shall be employed on such work, under such requisition shall be paid for his labour by day at the highest rate paid in the neighbourhood for similar work and, if he is required to work at night, at double such rate.

4. Payment shall be made to (such persons) from the public treasury; and if (they) shall have been employed upon a work belonging to a private person, the amount advanced from the treasury shall be recoverable from such persons by the same means which may be lawfully used for the recovery of arears of land revenue.

5. It shall be lawful for heads of villages, on the requisition of the Officer in-charge of such works, as aforesaid or in his absence on the requsition of the Tehsildar is on the spot of their own motion, to make requisition upon the inhabitants of their villages for the supply of materials, to wit, earth, stone, trees and leaves, bamboos, straw, gunny bags and the like necessary for preventing or repairing breaches in the embankments of tanks, river or channels, and to remove or seize, and if necessary, to cut down such materials wherever they may be found, giving receipts for them in writing; such materials shall be paid for from the public treasury at the highest prices for which they are sold in the neighbourhood and in case damage in sustained by any person in consequence of the removal, seizure or cutting down of any such materials, compensation shall be made for such damage, the amount of which compensation shall, in case of dispute, be determined in the same manner as amounts payable under section 6. When the work for which such materials are used belongs to a private person, the amount advanced from the treasury shall be recoverable from him by the same means by which arears of of land revenue are recoverable.

6. Whenever by local custom any work for the purpose of irrigation or drainage, or connected therewith, is usually executed by the Joint Labour of a village community, any person bound by such custom to contribute labour to such work,who neglects or refuses without reasonable cause to comply with a requisition for such customary aid made to him by the head of the village under the orders of the Tehsildar or other superior Revenue Officer shall be liable to pay a sum equal to twice the value of the labour which he is bound to contribute.

The amount so payable shall, in case of dispute, be determined summarily by a Village Panchayat assembled by order of the Collector through the village Munsif according to the rules for assembling such Panchayats prescribed in Regulations V and VI of 1816.

Such amount shall be payable on demand, and, on non-payment, the same may be recovered by the same means by which arears of land revenue are recoverable.

All sums paid or recovered under this section shall be applicable to the expenses of any works for the purpose of irrigation or drainage executed for the benefit of the village Committee to which the defaulters respectively belong.

APPENDIX VIII—A

GOVERNMENT OF ANDHRA PRADESH
PUBLIC WORKS DEPTT.

Irrigation—Minor Irrigation Works in Telangana area entrusted to ayacutdars payment of initial security deposit—Exempted in relaxation of para 154(iii) of P.W.D. Code—Orders—Issued.

G.O.Ms. No. 42. dated 3-1-1959.

Minutes of the Meeting held in the Chamber of the Minister (Irrigation & Power) on 29-10-1958.

Order :

In relaxation of para 154 (iii) of PWD Code the Government direct that the ayacutdars, entrusted with Minor Irrigation Works (in Telangana area) be exempted from the payment of initial security deposit.

(By order and in the name of the Governor).

AKBAR NAWAZ JUNG,
Dy. Secretary to Govt.

Endt. No. 6131-Ac/58-4, dated 2-2-1959.

Copy forwarded to the Officers of the Department for information and necessary action.

J.C. HARDIKAR,
Chief Engineer, General.

To

The Superintendent Engineers of Circles.
Copy to all Chief Engineers.

APPENDIX VIII—B

A copy of G.O.Ms. No. 2379, dated 1st October 59, from the Government of Andhra Pradesh, Hyderabad, Public Works Department to all Heads of Departments.

SUBJECT : *Contracts Labour. Co-operative Societies—Entrustment of works concessions—Sanctioned in G.O.Ms. No. 505, Public Works, dated 27th February,* 1956—*Continuance—Orders issued.*

REFERENCE: G.O.Ms. No. 505, Public Works & Transport, dated 27-2-1956

From the Chief Engineer (High-ways) letter No. 57435-El/57-1, dated the 29th November 1957.

From the Registrar of Co-operative Societies Letter No. 9804/58-B, dated 8th Feburary, 1958.

From the Accountant General letter No.:TAH Genl. 486, dated 26-2-1958.

From the Director, Social Welfare letter No. A2/188/58, dated the 10th February, 1958.

From the Chief Engineer (Highways) letter No 57435-El/57-6, dated the 16th July, 1958.

From the Chief Engineer (Highways) letter No. 57435-El/57-8, dated the 16th April, 1959.

From the Chief Engineer (General) Letter No 2694 AC/57-5, dated 17th March, 1958.

Order :

The Government hereby direct that the concessions granted in the Government Order first read above, in regard to the entrustment of works to the Labour Contract Co-operative Societies and Harijan Co-operative Societies in respect of Public Works and Highways Departments shall be continued for a further period of three years with effect from 27-2-1958 without enhancing the existing monetary limit of works to be entrusted to these Societies.

(By order and in the name of the Governor of Andhra Pradesh)

AKBAR NAZWAZ JUNG,
Deputy Secretary to Govt.

Copy of Govenment of Andhra Pracesh, Public Works Department, Memorandum No. 48701 Q1/59-1, dated the 3rd October 1959.

SUBJECT : Contracts—Harijans Co-operative Societies and Labour Co-operative Societies—Certain concessions sanctioned in G.O.Ms. No. 505-Public Works and Transport, dated 27-2-1956 applicability to the Telangana Area.

REFERENCE: G.O.Ms. No. 505, Public Works and Transport, dated 27-2-1956.
G.O. Ms. No. 770, Public Works Department, dated 3-4-1957.

It is understood that the orders issued in the Government Orders cited are not being followed in the Telangana area since the Government order second cited was in amplification of the earlier Government Order issued in Andhra State and arose out of correspondence initiated by the Registrar, Co-operative Societies, Andhra prior to 1-11-1956 and also that it was not specifically stated in the Government Order second cited that it applied to the whole of Andhra Pradesh.

It is hereby clarified that the orders issued in the above Government Orders shall be applicable to the entire State of Andhra Pradesh.

AKBAR NAWAB JUNG,
Deputy Secretary to Government.

A copy of Endorsement No : D. Dis. No. 34240/59, dated the 23rd November 1959, from the Office of the Chief Engineer, PW.D., General, Andhra Pradesh, Hyderabad- Deccan, addressed to all Other Chief Engineers and others.

Communicated to the Superintending Engineers of Circles in continuation of this office Endorsement No. : 2694 AC/57-4, dated the 13th August, 1957

J. C. HARDIKAR
Chief Engineer (General)

A copy of G.O.Ms. No. : 505, dated the 27th February, 1956, from the Government of Andhra, Public Works and Transport Department addressed, to all Chief Engineers and others.

Sub : Contracts—Harijan Co-operative Societies and Labour Co-operative Societies—Certain concessions—Sanctioned.

Ref : G.O.Ms. No. 3778-Public Works, dated 9-10-1950.

From Sri B. S. Murthy, M.P., Letter dated 17-4-1954.

From the Chief Engineer (Electricity) letter No. E2/A2/B43/110, dated 2-9-1956.

From the Chief Engineer, (General and Buildings) lr.No: 4855-WKS/54-4 dated 14-10-1954.

From the Chief Engineer (Highways) lr. No. 16110-El 54-HR date 23-10-1954.

From the Registrar of Cooperative Societies Andhra lr. No. 8007/55R2, dated 26-2-1955.

From the Chief Engineer (General & Buildings) lr. No. 4855 WKS/54-54, dated 6-8-1955.

Order .:

In supersession of G.O.Ms. No. 3778 Public Works dated 9-10-1950 the Government direct that the following concessions be granted for a period of two years to the Labour Contract Co-operative Societies and Harijan

Co-operative Societies in regard to entrustment of contracts to these Societies in respect of Public Works and Highways Departments :—

(*a*) A deposit of 1% only should be obtained as earnest money deposit from the Labour Contract Co-operative Societies and Harijan Co-operative Societies.

(*b*) The Labour Co-operative Societies and Harijans Co-operative Societies should be entrusted with unskilled work on nomination whenever such societies exist in preference to others.

(*c*) Though the Executive Engineers are empowered to dispense with tenders up to Rs. 10,000/- in general, the labour C-ooperative Societies and Harijan Co-operative Societies should be given preference in regard to entrustment of works up to Rs. 10,000 on nomination without calling for tenders.

(by order of the Governor).

V. V. SUBARAMANIAN,
Secretary to Government

APPENDIX VIII-C

GOVERNMENT OF ANDHRA PRADESH

Abstract

Irrigation—Entrusting of Irrigation Works of Telangana Districts to Bharat Sevak Samaj—Orders—Issued.

PUBLIC WORKS DEPARTMENT

G.O.Ms. No. 2701, dated 16-10-1958.

From the Special Chief Engineer (General) letter No. 38493/58 K-2, dated 17-7-1958.

From the Chief Engineer (General) lr. No. 2698/58/N/3064, dated 9-9-1958.

Order

In the circumstances reported by the Chief Engineer, (Irrigation & General) the Government accept his proposal to entrust the Minor Irrigation Works in the Districts of the Telangana Area to the Bharat Sevak Samaj subject to the following conditions :—

(1) The Minor Irrigation works in the Telangana Area shall be let out to the Bharat Sevak Samaj on negotiation, dispensing with tenders up to an amount of Rs. 25,000.

(2) An advance to the extent of 10% of the estimated cost of the work entrusted in each Dist. shall be paid to the Bharat Sevak Samaj.

(3) The advance so paid shall be recovered at the rate of 20% of each Bill. The bulk of advance shall be repaid to the end of the working season failing which no fresh advance will be sanctioned.

(4) The Bharat Sevak Samaj shall be exempt from payment of earnest money and further security deposit on all the Minor Irrigation Works undertaken by them under this programme.

(5) A recovery of 4% from each bill shall be effected and set apart for Community Development programme by the Bharat Sevak Samaj.

(6) The Bharat Sevak Samaj shall execute the works at 5% less than the estimated rates as a general principle. While catering into agreement for individual works, the rates for individual items in the schedule will be shown 5% less than estimated rates for that item.

(7) Monthly payments of bills shall be made to the Bharat Sevak Samaj according to the standard practice in the Public Works Department.

(8) The Bharat Sevak Samaj will have to refer to the estimates and plans before signing the Agreement Bonds for individual work in the concerned Division.

2. The Government delegate powers to the Executive Engineers to dispense with tenders for estimates costing up to Rs. 25,000 when work is to be entrusted to the Bharat Sevak Samaj under the above programme.

3. The Chief Engineer (Irrigation) is requested to proceed with the entrustment of the work to the Bharat Sevak Samaj after obtaining the concurrence of that Institution to the above conditions.

(By order and in the name of the Governor of Andhra Pradesh).

AKBAR NAWAZ JUNG,
Deputy Secretary to Government

To

The Chief Engineer (Irrigation).
The Accountant General, Hyderabad.
The Convenor, Bharat Sevak Samaj, through C.E.I.

APPENDIX IX-A

Tabular Statement of Case Studies of 23 tanks

Sl. No.	Name of the Tank/ Location	(Restored—Cost—Year or un-restored)	Settled ayacut	Present Ayacut	Average Irrigation	Extent of Silting*	Water table
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1.	Brahman Cunta Gagan Pahad Hyderabad.	Being restored (estimate Rs. 2240)	31 acres	31 acres	20 acres (for the last three years)	about 3 ft.	10 to 20 ft.
2.	Nalla Cheru Madan Palli, Hyderabad.	Restored (1959) cost Rs. 9300.	30 acres	30 acres	27 acres (10 years)	about 2 ft.	8 to 12 ft.
3.	Krishna Cunta Hyderabad	Unrestored.	97 acres	97 acres	56 acres (10 years)	about 2 ft.	10 to 15 ft.
4.	Mysamma Cheru, Palam Kole Hyderabad.	Unrestored	700 acres	700 acres	519 acres (10 years)	could not be judged.	6 to 10 ft.
5.	Patha Cheroo, Chinapur village, Medak.	Restored (1958) cost Rs. 13230.	172 acres	127 acres	126 acres (10 years)	about 2 ft.	10 to 12 ft.
6.	Krishna Sagar, Kandi Village, Medak.	Unrestored	177 acres	—	127 acres	about 4 to 5ft.	4 to 6 ft.
7.	Pedda Cheru Rudra Ram, Medak	being restored (estimate Rs. 7420)	278 acres	170 acres	190 acres (10 years)	about 2 ft.	12 to 15 ft.
8.	Malkapur Tank, Medak.	Restored (long back, cost not known)	2260 acres	—	varied from 786 to 1773 acres (Range)	could not be judged.	6 to 12 ft.
9.	Deva Cheru, Kandi, Medak.	Restored cost Rs. 61,638	119 acres	119 acres	varied from 36 to 114 acres (Range)	upto 10 ft.	about 10 ft.
10.	Meer Sahab Kunta vill. Karimabad, Warangal.	not restored.	42 acres	38 acres	36 acres (10 years)	about 2 ft.	4 to 10 ft.
11.	Mylarm Large Tank, Warangal	restored (cost Rs. 35,000)	1093 acres	1201 acres	figures not available.	could not be judged.	12 to 14 ft.

*Silting was observed on the fringes of the tanks and the figures are based on visual approximation.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
12.	Choppa Kunta, Katryal, Warangal.	under restoration (estimate Rs. 8100)	53 acres	50 acres	49 acres (10 years)	about 1½ ft.	10 to 12 ft.
13.	Kudari Gudam Tank, Ellenda, Warangal.	under restoration (estimate Rs. 19600)	101 acres	90 acres	91 acres (10 years)	about 1½ ft.	8 to 12 ft.
14.	Beerana Kunta V. Karimabad Warangal.	Unrestored.	8 arces	—	not available	heavily silted	10 to 12 ft.
15.	Edula Cheru V. Thalampad, Khammam.	Restored long back, cost not known)	254 acres	238 acres	238 acres (3 years)	slight	—
16.	Large Tank of V. Gurralpad, Khammam.	Restored (1943) cost Rs. 2333	42 acres	39 acres	39 acres (3 years)	slight	—
17.	Oora Cheru, Edilapur, Khammam	Restored about 3 years back (cost not given)	151 acres	149 acres	140 acres (3 years)	badly silted towards foreshores	18 ft.
18.	Petta Tank, Mustababad, Dist. Krishna.	Restored (1949) cost Rs. 10,000/	306 acres	312 acres	262 acres (3 years)	slight	5 to 6 ft. upto 30 ft. in summer.
19.	Pedda Tank, Mustababad, Krishna.	Restored (1949) cost Rs. 50,000/-	600 acres	685 acres	600 acres (4 years)	slight but near foreshores heavy silting.	Do.
20.	Marla **Padu** Tank, Krishna.	Restored cost Rs. 10,000/-	245 acres	550 acres	418 acres (3 years)	slight	3 to 12 ft.
21.	Bhairvani Cheru, Panthangi, Vill. Dist. Nalgonda.	Restored cost Rs. 48,000 recently.	218 acres	218 acres	breached tank since long, no irrigation so far.	about 2 ft.	about 15 ft.
22.	Ekvacheru, Vangapalli Dist. Nalgonda.	Under restoration, estimated Rs, 12,340	38 acres	38 acres	12 acres	about 34 ft.	about 15 ft.
23.	Kothacunta, Kolpak Dist. Nalgonda.	Under restoration estimate Rs. 4660/-	27 acres	27 acres	25 acres	about 2 ft.	about 14 ft.

APPENDIX IX-B

RESULTS AND SUMMARY OF CASE STUDIES OF 23 TANKS.

Gagan Pahar Brahman Cheru, Dist. Hyderabad

This small tank with a settled ayacut of 31 acres and average irrigation of 20 acres was under restoration at an estimated cost of Rs. 2,240. The tank had silted to about 3 ft. depth. Weeds were also present in the tank. Water table in the ayacut area varied from 10 to 20 ft. Mostly Abi paddy was grown and very little area was sown in Rabi season. Shri S. Balla Reddi of village Gagan Pahar had dug a well close to the ayacut of the tank. He was growing half an acre of paddy and maintaining one acre of garden with the help of water raised from the well.

Another zamindar named G. Lalta Prashad had also constructed four wells in the very vicinity of the tank in the fore-shore area and he too was growing 2.5 acres of paddy and 0.5 acres of vegetables and was maintaining a garden of 32 acres. Three of his wells were fitted with diesel oil pumping sets.

The price of wet land varied from Rs. 200 to Rs. 500 and that of dry land was reported to be about Rs. 100 per acre in the vicinity.

2. *Nalla Cheru Madanpalli, Dist. Hyderabad*

The tank had an ayacut of 30 acres and had been restored at a cost of Rs. 9,300. The extent of silting was up to about 2 feet, and weeds were present in the tank bed. Water table in the ayacut varied from 8 to 12 feet. There was partial water-logging and salts were visible in some patches. On account of shortage of water on the tank only Abi paddy was grown.

3. *Krishna Cunta, Kothur, Dist. Hyderabad.*

This was an un-restored tank having an ayacut of 79 acres but with an average irrigation of 56 acres only. About 2 feet of siltation had taken place. Weeds were also present in the tank bed. Water table was about 10 to 15 feet and there were 20 wells in the ayacut which were being used for raising of nursery and supplementing the short supply of water in the tanks. Only Abi paddy was under cultivation.

4. *Mysamma Cheru, Palam Kole, Dist. Hyderabad*

This is another example of an un-restored tank with an ayacut of 700 acres, but with an average irrigation of 519 acres only. Water table in this case varied from 6 to 10 ft. The ayacut was partly water-logged and both Abi and Tabi paddy was grown.

5. *Patha Cheru, Chinapur, Dist. Medak*

The tank has an ayacut of 172 acres, and is irrigating 126 acres. The restoration cost of this tank came to Rs. 13,230. Silt was present up to about 2 feet depth, and it was used as manure on light red soils. Weeds were also present and there was no waterl-ogging or alkalinity in the soil. The depth of water table in the sub-soil was about 12 ft. Abi and Tabi paddy was being cultivated. Although water remained in the tank practically for the whole year, yet zamindars sometimes quarrel for water during the Tabi season.

6. *Krishna Sagar Tank, Kandi, Dist. Medak*

This was an un-restored tank having an ayacut of 177 acres with average irrigation of 126 acres. The tank had silted upto about 4 to 5 feet. Water table in the ayacut was also about 4 to 6 feet and due to lack of drainage, there was water-logging in the area. Formerly only Rabi crop was sown due to water-logging, though now some Abi crop was also sown. Water was constantly oozing out through the bund of the tank which consequently was responsible for the development of alkalinity in the soil over a width of about 50 feet all along the bund. *The sluice was leaking and there was no waste-weir.* The condition of the standing crop of paddy was poor. Drainage was badly needed.

7. *Pedda Cheru, Rudra Ram, Dist. Medak*

The tank had an ayacut of 278 acres, of which about 190 acres were receiving irrigation on an average. It was under restoration with an estimate of Rs. 7420/-. The depth of silt in the tank was about 2 feet. There was no cultivation of the fore-shore land. Both Abi and Tabi paddy is grown.

8. *Malkapur Large Tank, Dist. Medak.*

The tank has a settled ayacut of 260 acres and irrigation varying from 786 to 1773 acres. The tank was restored long back and cost of its restoration was not available. Extent of siltng could not be judged. The tank was very deep and there were no weeds in it. Water table in the ayacut varied from 6 to 12 feet. Abi and Tabi paddy was being cultivated. The bund of the tank had slipped partially on the outside. Due to the weakening of the structure at that point, the tank could not store water to the desired capacity and consequently, production of paddy was suffering to that extent.

9. *Deva Cheru, Kandi, Dist. Medak*

This tank with an ayacut of 119 acres and irrigation varying from 36 to 114 acres was restored at a cost of Rs. 61,638/-. The tank bed was silted to a depth of about 10 feet. The heavy silting was due to erosion of the black cotton soil in the catchment area. There were many weeds in the tank. The condition of the tank was not satisfactory. The silt of the tank was being removed by the zamindars for application to light soils. Both Abi and Tabi Paddy was being taken, though the area under Tabi crop was much less than the Abi crop.

10. *Mir Sahib Kunta, Karimabad, Dist. Warangal*

The tank had an ayacut of 42 acres, of which 38 acres were receiving irrigation on the average. The silt was upto 2 feet. There were weeds about 6 feet high in the tank bed. Water table varied from 4 to 10 feet. Owing to heavy demand for water for Abi paddy, the water in the tank dries up during the winter so that it is not possible to take Tabi paddy. The bund of the tank was defective.

11. *Mylarm Large Tank, Dist. Warangal*

This is a fairly big tank with an ayacut of 1093 acres. The tank was restored at a cost of Rs. 35,000. Water remains in the tank for whole of the year. The tank breached about 20 years ago. It was not possible to judge the extent of silting. The depth of water table in the sub-soil varied from 12 to 14 feet. Both Abi and Tabi paddy is taken.

12. *Choppa Kunta, Katryal, Dist. Warangal.*

. The tank had an ayacut of 53 acres with an average irrigation of 49 acres. It was under restoration with an estimate of Rs. 8100. The extent of siltation was about one and half feet. There were 10 wells in the ayacut for raising of nursery and supplementing supply of water for the ayacut for paddy. Ony Abi paddy was grown. Water table in the wells varied from 10 to 12 feet.

13. *Kudari Gudam. Ellanda, Dist. Warangal*

Registered ayacut of this tank was 101 acres, of which 91 acres were receiving irrigation on the average. The tank was being restored at a cost of Rs. 19,000. The extent of silting was about one and a half feet. Water table varied from 8 to 12 feet and in order to supplement the short supply of water for the Abi paddy the zamindars had dug 22 wells in the ayacut area.

14. *Beerana Kunta, Karimabad Dist. Warangal.*

This is an example of a small tank having an ayacut of only 8 acres. It was not being maintained by any agency but only by the ayacutdars. The tank was badly silted and was in a state of utter neglect. Only Abi paddy was grown with the limited water supply.

15. *Edula Cheru. V. Thalam Pad, Dist. Khammam.*

The tank had an ayacut of 254 acres with an average irrigation of 238 acres. It was restored long ago and the cost of restoration was not available. Extent of silting was reported to be slight. Only one Abi paddy of 6 months duration was taken. Surplus water from the tank was flowing to river Muneero.

16. *Large tank of Village Gurralpad, District Khammam.*

The ayacut under this tank was 42 arces with an average irrigation of 39 acres. It had been restored at a cost of Rs. 2333. Siltation of tank bed was not much. The zamindars take only one crop of Abi paddy.

17. *Oora Cheru, Edilapur, Dist. Khammam*

This is a restored tank with an ayacut of 151 acres and average irrigation of 149 acres. The tank showed siltation towards the fore-shore side where weeds had also established themselves. Water table in the ayacut was about 18 feet. Only Abi paddy was grown. Small trees and bushes were seen on the bund. There were two wells close to the ayacut where chillies were grown. Price of the wet land varied from Rs. 1000 to Rs. 2000 per acre.

18. *Petta Tank, Mustababad, Dist. Krishna.*

This tank had an ayacut of 306 acres with an average irrigation of 262 acres. It was restored in 1949 at a cost of Rs. 10,000. Silt had been deposited towards the fore-shore side and the weeds which were as high as 6 feet. As the sub-soil water was brackish there was no well in the ayacut area. Abi paddy of six months duration was being cultivated followed by crops like sunhemp, fodder, green grams, cholum etc. during the Tabi season. The fore-shore lands were also under cultivation. Price of wet land varied from Rs. 3000 to Rs. 4000 per acre and that of dry land from Rs. 500 to Rs. 1000 per acre.

19. *Pedda Tank, Mustababad, Dist. Krishna.*

The registered ayacut of this tank was 685 acres and average irrigation 600 acres. This tank had been restored at a cost of Rs. 50,000. Silt had deposited in the weedy area towards the fore-shore side of the tank bed. Paddy crop of 6 months duration was being grown in the Abi season. Crops like sunhemp, cholum etc. are sown in the Tabi season. Price of wet land varied from Rs. 3000 to Rs. 4000 and of dry land from Rs. 500 to Rs. 1000 per acre.

20. *Marla Padu Tank, Gannaveram, Dist . Krishna*

The tank had an ayacut of 550 acres with an average irrigation of 418 acres. It was restored at a cost of Rs. 10,000, Paddy crop of six months duration was grown in the Abi season. During Tabi fodder crops like sunhemp, various grams, cholum, etc., are usually grown. The sub-soil water being brackish, there was no well in the ayacut area.

21. *Bhairvani Cheru, Panthangi, District Nalgonda.*

This tank was in breached condition since long. It has since been restored at a cost of Rs. 48,000, The tank is proposed to irrigate 218 acres This year only 10 acres of paddy are grown. At some places level in the tank-bed was almost the same as in the adjoining fields of fore-shores. There were three wells in the tank ayacut. Depth of water table was about 15 ft. The price of wet and dry lands varied from Rs. 800 to 1200 and from Rs. 100 to Rs. 200 respectively.

22. *Ekvacheru Vangapalli, District Nalgonda.*

This tank is in series and has not so far been restored. It has got a settled ayacut of 38 acres and 22 guntas. Average irrigation of this tank is 12.30 acres in Abi season and 3 acres in Tabi season. There was a well in the ayacut of this tank. The well was fitted with diesel pumping set. In Tabi season paddy is matured with the help of water from the pumping set, because very little water remains in the tank in Tabi season. Water supply from the well is available for the whole of the year. Alkalinity was visible in the ayacut area of the tank. No field channels existed in the ayacut, so much so that even the water from the pumping set was being applied to the paddy field by field. The old masonry sluice was also leaking. Water table was about 15 feet. The tanks bed was silted up to about 3 to 4 feet depth. The price of wet land varied from Rs. 500 to Rs. 1000 per acre and that of dry land from Rs. 200 to Rs. 500 per acre.

23. *Kothacunta Kolpak, District Nalgonda.*

This tank was under restoration, with an estimated cost of Rs. 4660. The tank had an ayacut of 27 acres and 11 guntas. It breached in the year 1958. Only paddy in Abi season was grown in the ayacut area. At the time of inspection the tank was absolutely dry. Water of the tank was reported to be saltish, and alkalinity was visible in the ayacut area. There were three wells in the ayacut and water table was about 14 feet. The tank bed had silted to about 2 feet.

APPENDIX X

Table showing Evaporation losses in Andhra Pradesh

Name of month	Hyderabad	Kurnool	Hanam Konda	Coco-nada
January	5·15	6·32	7·10	4·74
February	6·13	7·98	8·09	4·37
March	9·86	13·21	10·54	4·90
April	12·60	16·08	12·33	4·89
May	18·69	17·76	19·10	5·67
June	9·30	12·57	14·55	5·97
July	6·05	9·08	7·01	4·43
August	5·77	8·46	7·81	3·47
September	4·53	6·42	6·33	3·50
October	4·52	5·86	7·04	5·05
November	4·89	5·16	6·84	6·03
December	4·40	4·96	6·60	5·86
Total	92·89	113·86	113·34	58·88

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*Vide Scientific Notes, Vol. VI 61-68, India Meteorological Department.

APPENDIX XI

Economics of growing Tabi Paddy and other Crops

Sl. No.	Name of the crop	Cost of cultivation including fertilizers			Out-turn per acre			Net Return			Remarks
		Rs.		Rs.	lbs.		lbs.	Rs.		Rs.	
1.	Paddy(Tabi)	200	to	250	1500	to	2000	40	to	70	
2.	Jowar (Winter) ..	50	to	70	500	to	750	30	to	50	
3.	Chillies ..	100	to	130	750	to	1000	50	to	70	
						(Cured leaf)					
4.	Tobacco	500	to	700	2000	to	3000	140	to	300	
5.	Onions ..	100	to	150	1500	to	2000	80	to	100	
6.	Wheat ..	100	to	120	600	to	800	60	to	90	

N.B.— In the place of Tabi paddy, the other crops shown above if grown, more area can be irrigated under tanks with better income to the ryots.

APPENDIX XII

Average Yield Per Acre of Crops in lbs. (1951-52 *to* 1957-58.)

Sl. No.	Name of Crop		1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58
(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)
1.	Rice	Andhra Pradesh ..	879	905	1,078	1,087	1,015	1,006	1,114
		All India ..	637	682	805	780	780	799	704
2.	Bajra	Andhra Pradesh ..	357	396	302	348	430	402	590
		All India ..	220	264	333	276	270	232	291
3.	Jowar	Andhra Pradesh ..	340	435	404	465	401	387	427
		All India ..	340	374	406	470	346	402	436
4.	Ragi	Andhra Pradese ..	710	817	924	611	625	620	757
		All India ..	535	532	717	642	714	659	652
5.	Wheat	Andhra Pradesh ..	284	230	183	286	261	193	166
		All India ..	582	681	670	717	632	621	578
6.	Maize	Andhra Pradesh ..	265	1,022	647	618	536	500	732
		All India ..	560	710	701	708	628	733	703
7.	Cotton	Andhra Pradesh ..	56	49	39	54	50	52	63
		All India ..	76	80	90	89	78	93	92

Source : Area, Production and Average yield per acre of principal crops in India 1950-51 to 1957-58. Economic and Statistical Adviser to the Government of India, Ministry of Food and Agriculture.

APPENDIX XIII-A

ACT NO. XXIV OF 1955

An Act to provide for the levy of compulsory water-cess on lands irrigable from certain irrigation works.

Whereas it is expedient to provide for the levy of compulsory water-cess on lands irrigable from certain irrigation works;

BE it enacted in the Sixth Year of the Republic of India as follows :—

1. Short title and extent :—(1) This Act may be called the Andhra Irrigation Works (Levy of Compulsory Water-Cess) Act, 1955.

(2) It extends to the whole of the State of Andhra.

2. Definitions :—In this Act, unless the context otherwise requires :—

(*a*) "Government" means the State Government;

(*b*) "Irrigation work" or "work" includes :—

(*i*) all canals, channels, tanks, wells, reservoirs, ponds, spring ponds and madugus used for the supply of storage of water for purposes of irrigation, and all dams, embankments, weirs, sluices, groynes and other works (other than escape channels) connected therewith or auxiliary thereto, which are owned or controlled by the Govt., or constructed or maintained by them and not handed over to any person;

(*ii*) all such lakes and other natural collections of water, or parts thereof, as are situated on lands which are the property of Government;

(*iii*) all rivers and natural streams or parts thereof.

Explanation :—For the purposes of this clause any part or stage of an irrigation work which is notified under sub-section (2) of section 3, shall be deemed to be an "irrigation work".

(*c*) "owner" in relation to any land, means the person liable to pay the public revenue due on the land;

(*d*) "prescribed" means prescribed by rules made under this Act.

3. Levy of water-cess :—(1) Notwithstanding anything contained in any law for the time being in force, it shall be lawful for the Govt. to levy every fasli, water-cess on all lands under the irrigable command of any irrigation work constructed, expanded or altered by the Govt. whether before or after the commencement of this Act, although the lands are not actually irrigated under that work :

Provided that such levy shall not be made :—

(*a*) In the case of an irrigation work, the construction, expansion or alteration of which was completed before the commencement of this Act, until the expiry of three years from such commencement; and (*b*) in the case of an irrigation work, the construction, expansion or alteration of which is completed, on or after the date of commencement of this Act, until the expiry of three years from the date of such completion.

Explanation I:—In the case of lands which are actually irrigated under an irrigation work, the Madras Irrigation Cess Act, 1855 (Madras Act VII of 1865) shall continue to apply and water-cess on such lands shall be leviable under that Act.

Explanation II:—Lands which are already registered as wet under an irrigation work shall not be liable to the levy of water-cess under this Act.

(2) For the purpose of sub-section (1), the Govt. shall notify in the Andhra Gazette the date of completion of the construction, expansion or alteration by them of any irrigation work, either for the entire work or for any part or stage thereof.

4. Rate of water-cess :—Water-cess under this Act shall be levied in such manner and at such rate as may, from time to time, be prescribed by the Govt., and different rates may be prescribed for different irrigation works or different areas or different modes of irrigation.

5. Publication of notice :—(1) Before levying water-cess under this Act, a notice shall be published by the District Collector in the District Gazette and in such other manner as may be prescribed, specifying the lands under the irrigable command of the work, and liable for the payment of water-cess under this Act, together with the rate or rates of water-cess payable on the lands and the fasli year from which such levy shall be made, and requiring all persons interested to submit their objections, if any, in writing, to the Inquiring Officer prescribed in this behalf or to appear before him either personally or by agent and state their objections within forty-five days of the publication of the notice.

(2) Separate notices to the same effect shall also be served in the prescribed manner on all persons known or believed to be the owners of, or interested in the lands specified in the notice, so far as such service may be practicable.

6. Inquiry and order:—On the date fixed under section 5 or on such other date to which the inquiry may be adjourned, the Inquiring Officer shall inquire into the objections received or recorded by him and submit the records of Inquiry to the District Collector together with his recommendations. The District Collector shall thereupon pass an order specifying :

(*a*) the lands concerned under the irrigable command of the work ;

(*b*) the rate or rates of water-cess payable on each of the said lands ; and

(*c*) the fasli year from which such water-cess shall be leviable.

7. Appeal :—Any person aggrieved by an order passed by the District Collector under sec. 6 may, within sixty days from the date of receipt of such order by him, appeal to the Board of Revenue.

8. Revision.—The Govt. may, at any time either *suo motu* or on application, call for and examine the records relating to any order passed, or proceeding taken by the Inquiring Officer or the District Collector under

section 6, or by the Board of Revenue under sec. 7, for the purpose of satisfying themselves as to the legality or propriety of such order or as to the regularity or such proceeding, and pass such order in reference thereto as they think fit.

9. Finality of orders.—Any order passed by the Govt. in revision under section 8 and subject to such order, the decision of the Board of Revenue on appeal under section 7, and subject to the order of the Govt. and the decision of the Board of Revenue on appeal, the order passed by the Dist. Collector under sec. 6, shall be final and shall not be liable to be questioned in any Court of Law.

10. When water-cess becomes payable.—Water-cess shall become payable under this Act on a written notice of demand therefor issued by an officer authorized by the Govt. in this behalf being served on the owner in accordance with the order passed under section 6, section 7 or section 8 specifying the amount payable.

Explanation.—If water-cess under this Act has been levied on any land for any fasli in pursuance of a written notice of demand issued under this Act, it shall not be necessary to follow the procedure prescribed in the foregoing provisions of this Act for levying water cess on that land for any subsequent fasli.

11. Sections 1-A and 2 of the Madras Irrigation Cess Act, 1865 to apply.—The provisions of sections 1-A and 2 of the Madras Irrigation Cess Act, 1865 (Madras Act VII of 1865), shall apply to the levy of water-cess under this Act as if it were a cess levied under the Madras Irrigation Cess Act, 1865 (Madras Act VII of 1865).

12. Power to make rules.—(1) The Government may make rules to carry out all or any of the purposes of this Act.

(2) In particular and without prejudice to the generality of the foregoing power, such rules may provide for :—

(*a*) the procedure to be followed in making inquiries and hearing appeals under this Act:;

(*b*) the manner of service of notices and orders issued under this Act;

(*c*) the delegation of the powers of the Govt. to the Board of Revenue; District Collector or other authorities subject to control and revision by the Government;

(*d*) all matters which are expressly required or allowed by this Act to be prescribed.

(3) The power to make rules conferred by this section shall be subject to the condition of the rules being made after previous publication for a period of not less than two weeks.

(4) All rules made under this section shall be published in the Andhra Gazette and shall, unless some later date is appointed, come into force on the date of such publication.

(5) All rules made under this section shall be laid on the table of the Legislative Assembly, as soon as possible after they are published, and

shall be subject to such modifications, whether by way of repeal or amendment, as the Assembly may make within fourteen days thereafter during the Session in which they are so laid.

13. Power to remove difficulties.—If any difficulty arises in giving effect to the provisions of this Act, the Govt. may make such ordres not inconsistent with the said provisions as appear to them to be necessary or expedient for the purpose of removing the difficulty.

(By Order of the Governor)

APPENDIX XIII-B/I

WATER RATES IN (OLD) MADRAS STATE APPLICABLE TO ANDHRA REGION OF PRESENT ANDHRA PRADESH

Standard scale of water cess on dry land.

Description of crop	Charge per acre	
	1st class source	2nd class source
	Rs. As.	Rs. As.
(*a*) Sugarcane, betel, plantation, turmeric and elephantyam.	6 0	4 8
(*b*) Any other crop which requires water for more than six months.	6 0	4 8
(*c*) Crops other than those specified in clauses (*a*) and (*b*) :—		

No.	First crop	Second crop	1st class source						2nd class source					
			1st crop		2nd crop		Total		1st crop		2nd crop		Total	
(1)	(2)	(3)	(4)		(5)		(6)		(7)		(8)		(9)	
			Rs.	As.	Rs.	As.	Rs.	As.	Rs.	As.	Rs.	As.	Rs.	As
1.	Wet crop	Wet	4	0	2	0	6	0	3	0	1	8	4	8
2.	Do.	Dry systematically irrigated.	4	0	1	8	5	8	3	0	1	2	4	2
3.	Do.	Dry occasionally irrigated.	4	0	1	0	5	0	3	0	0	12	3	12
4.	Dry systematically irrigated.	Wet	3	0	2	8	5	8	2	4	1	14	4	2
5.	Do.	Dry systematically irrigated.	3	0	2	0	5	0	2	4	1	8	3	12
6.	Do.	Do.	3	0	1	8	4	8	2	4	1	2	3	6
7.	Dry occasionally irrigated.	Wet	2	0	3	0	5	0	1	8	2	4	3	12
8.	Do.	Dry systematically irrigated.	2	0	2	8	4	8	1	8	1	14	3	6
9.	Do.	Dry occasionally irrigated.	2	0	2	0	4	0	1	8	1	8	3	0

	First class source	2nd class source
	Rs. As.	Rs. As
(*d*) Third crop (if wet)	2 0	1 8
(*e*) Dry weather systematically or occasionally irrigated.	1 0	0 12

Source

Information supplied by the Revenue Department Government of Madrass in November, 1953.

APPENDIX XIII-B/II

WATER RATES IN (OLD) HYDERABAD STATE, APPLICABLE TO TELANGANA OF PRESENT ANDHRA PRADESH:

Water charges in Hyderabad State are not based on volume of water but on the area irrigated irrespective of the amount of water used. The rates are known as consolidated "water or garden Rates", While applying the rates, soil classification value, capacity of water source, produce per acre, general economic conditions of the ryots, proximity to market place and transporting facilities etc are taken into account. The State of Hyderabad has been divided into three regions namely Marathwada, Karnatak and Telangana, for water rates.

RATES SANCTIONED FOR :—

Marathwada & Karnatak

	Rate per Acre
Under flow irrigation.	
(*a*) From garden Lands	OS. Rs. 4 to Rs. 15
(*b*) Wet rates	
(I) In caseof single crops	OS. Rs. 4 to Rs. 18
(II) In case of Double crops (i.e. Do Fasla). ..	Half the Rate of single crop is charged.

Telengana Region

Under Lift Irrigation ..		OS. Rs. 5 to Rs. 12
Under flow Irrigation ..	(*a*) Single crop.	OS. Rs. 12 to Rs. 20
	(*b*) Double Crop.	OS. Rs. 18 to Rs. 30

For lands irrigated by wells situated outside the ayacut *i.e.* irrigable area highest dry rate of the respective village is levied irrespective of the fact that wet or garden cultivation is made under such sources. The assessment per acre of various crops in different areas includes both land cess and irrigation charges, whether the irrigation is carried on by means of a Government Tank or a project canal. However, an idea of the exclusive irrigation charges per acre of different crops can be had from the following water rates charged for the excluded soils, in the area that was originally classified as dry under the Nizamabad Project, but found suitable for irrigation afterwards.

	Name of Crops	*Rate per acre* Rs.	As.	Ps.
1.	Single Crop (Rice)	3	9	2
2.	Double Crop (Rice)	12	13	9
3.	Sugarcane	23 to 28	2 4	2 7

4.	Oranges, Limes and Sweet Limes	8	9	2	
5.	Plantains and Grapes	12	13	9	
6.	Turnips, Onions, Betel Nuts	19	4	7	
7.	Bagatu (Garden Crop)	6 7	0 11	0 5	in 1st crop in 2nd crop
8.	Kharif	3	0	0	
9.	Rabi	5	2	3	

NOTE:—Information supplied by the Public Works Department, Government of Hyderabad in May, 1954.

APPENDIX XIII-B/III

WATER RATES FOR MINOR IRRIGATION WORKS IN BOMBAY STATE

I. *Canal Irrigation for major irrigation works.*
Deccan Irrigation Area

	Nature of Crops	*Rate per acre* Rs.	
1.	Sugarcane, Plantains, and Pan gardens per year ..	120	
2.	Perennials other than sugarcane, Pan gardens and Plantains.	80	
3.	Two season crops from 15th June to 14th Feb. following	14	(applied to two season crops in or out of two seasonal blocks).
4.	Kharif crops : Monsoon season from 15th June to 14th Oct.	6	
5.	Rabi crops : cold weather season from 15th Oct. to 14th Feb. following.	8	
6.	Hot weather crops : Hot weather from 15th Feb. to 14th June.	15	
7.	Pre-seasonal watering in the Hot-weather season ..	7/8/-	
8.	Post-seasonal waterings	3	

II. *Minor Irrigation works* (*Central Circle*)

	Name of crop	*Water rates per acre per annum* Rs.
1.	Sugarcane and Plantains	80
2.	Other perennials	40
3.	Kharif Monsoon	6
4.	Rabi	8
5.	Hot weather	12
6.	Two-seasonal	14
7.	Single watering	3
8.	Pre-seasonal in hot weather or Rabi	8

APPENDIX XIV

The following Act of the Andhra Legislature received the assent of the Governor on the 20th December 1955, and is hereby published for general information:—

ACT NO. XXV OF 1955.

AN Act to provide for the levy of betterment contribution on certain lands in the State of Andhra.

Whereas it is expedient to provide for the levy of betterment contribution on certain lands in the State of Andhra.

Be it enacted in the Sixth Year of the Republic of India as follows :—

1. Short title and extent:—

(1) This Act may be called the Andhra Irrigation (Levy of Betterment Contribution) Act, 1955.

(2) It extends to the whole of the State of Andhra.

2. Definitions.—In this Act, unless there is anything repugnant in the subject or context: —

(1) "contribution" means the betterment contribution referred to in Section 3;

(2) "Government" means the State Government;

(3) "notification" means a notification published in the Andhra Gazette, and the work, "notified" shall be construed accordingly;

(4) "owner" in relation to any land, means the persons liable to pay the public revenue due on the land, and includes a ryot having a permanent right of occupancy within the meaning of the Madras Estates Land Act, 1908 (Madras Act 1 of 1908);

(5) "Prescribed" means prescribed by rules made under this Act;

(6) "work" means an irrigation work or drainage work as defined hereunder—

(*a*) "irrigation work" includes—

(*i*) all canals, channels, tanks, wells, reserviors, ponds, spring ponds and madugus used for the supply or storage of water for purposes of irrigation and all dams, embankments, weirs, sluices, groynes and other works (other than escape channels) connected therewith or auxiliary thereto, which are owned or controlled by the Government, or constructed or maintained by them and not handed over to any person;

(*ii*) all such lakes and other natural collections of water, or parts thereof, as are situated on lands which are the property of Government.

(*iii*) all rivers and natural streams of parts thereof.

(*b*) "drainage work" includes the following works which are owned or controlled by the Government, or constructed or maintained by them and not handed over to any person:—

(*i*) channels, whether natural or artificial, for the discharge of waste or surplus water, and escape channels from an irrigation work, together with dams, embankments, weirs, sluices, groynes and other works connected with or auxiliary to all such channels;

(*ii*) all works for the protection of lands from floods or from erosion.

Explanation.—For the purpose of this clause, any part or stage of a work which is notified under sub-Section (2) of Section 3 shall be deemed to be a 'work'.

3. Levy of betterment contribution.—(1) the Government shall be entitled to levy a betterment contribution, in accordance with the provisions of this Act, from the owner of any land which, in their opinion is benefited or is capable of being benefited, by the completion of the construction, expansion or alteration by the Government, whether after the commencement of this Act, or at any time before such commencement but not earlier than the 15th August 1947, of any work (including the installation by them of a pumping set), the cost of which exceeds one lakh of rupees.

Provided that no contribution shall be levied until the expiry of three years from the date of completion of the construction, expansion or alteration of the work.

Explanation.—1. A land shall be deemed to be "capable of being benefited" notwithstanding that the benefit is not enjoyed provided that such non-enjoyment is due solely to any action or inaction on the part of the person or persons interested in such land.

Explanation II. A land shall not be deemed to be benefited merely by reasons of the maintenance of an existing work wholly or partly at the expense of the Government.

(2) The Government shall notify the dates of commencement and completion respectively of the construction, expansion or alteration by them of any work either for the entire work or for any part or stage thereof, and all lands benefited or capable of being benefited by the completion of such work, part or stage as so notified shall be liable to pay betterment contribution.

4. Amount of contribution.—(1) The amount of contribution payable by an owner in respect of any land under work shall be so fixed as not to exceed one half of the increase in value on account of the completion of the construction, expansion or alteration of the work.

(2) For the purposes of this section, the increase in value on account of the completion of the construction, expansion or alteration of any work shall be the amount by which the value of the land on the completion date exceeds the value of the land on the construction date.

Explanation.—"Construction date" and "completion date" mean the dates of commencement and completion respectively of any work or part or stage thereof as notified under sub-Section (2) of Section (3).

5. Publication of notice.—(1) Before levying the contribution payable in respect of any land, a notice shall be published by the District Collector in the District Gazette and in such other manner as may be prescribed, specifying the lands under the commandable ayacut of the work and liable for the payment of contribution and requiring all persons interested to submit their objections, if any, in writing to the Inquiring Officer prescibed in this behalf or to appear before him either personally or by agent and state their objections within forty-five days of the publication of the notice.

(2) Separate notices to the same effect shall also be served in the prescribed manner on all persons known or believed to be the owners of, or interested in, the lands specified in the notice, so far as such, service may be practicable.

6. Inquiry and order by District Collector.—On the date fixed under section 5 or on such other date to which the inquiry may be adjourned, the Inquiring Officer shall inquire into the objections received or recorded by him and submit the records of Inquiry to the District Collector together with his recommendations. The District Collector shall thereupon pass an order specifying—

(*a*) the lands concerned under the irrigable command of the work.

(*b*) the increase in value of such lands by the completion of the construction, expansion or alteration of the work.

(*c*) the amount of the contribution leviable on each of the said lands, and

(*d*) the fasli year from which the contribution shall be leviable.

7. Appeal.—Any person aggrieved by an order passed by the District Collector under Section 6 may, within sixty days from the date of receipt of such order by him, appeal to the Board of Revenue.

8. Revision.—The Government may, at any time, either *suo motu* or on application, call for and examine the records relating to any order passed, or preceeding taken by the Inquiring Officer or the District Collector under Section 6, or by the Board of Revenue under Section 7, for the purpose of satisfying themselves as to the legality or propriety of such order, or as to the regularity of such proceeding, and pass such order in reference thereto as they think fit.

9. Finality of orders.—Any order passed by the Government in revision under Section 8 and subject to such order, the decision of the Board of Revenue on appeal under Section 7, and subject to the order of the Government and the decision of the Board of Revenue on appeal, the order passed by the District Collector under Section 6, shall be final.

10. When contribution becomes payable.—Contribution shall become payable under this Act on a written notice of demand therefor issued by an officer authorised by the Government in this behalf being served on the owner in accordance with the order passed under Section 6, Section 7 or Section 8 specifying the amount payable.

11. Mode of payment of contribution.—(1) The contribution payable by an owner shall be paid by him in such number of annual instalments not exceeding twenty as may be fixed by the Government or by any authority or officer authorized by them in this behalf.—

Provided as follows :—

(*i*) if, on or before the date on which the first instalment is payable the owner pays in a lump sum the entire contribution, he shall be entitled to a rebate of ten per cent calculated on such contribution;

(*ii*) if, on any date within a period of two years after the first instalment is payable, he pays in a lump sum the entire amount of contribution outstanding against him on that date, he shall be entitled to a rebate of ten per cent calculated on such outstanding amount.

Explanation.—In the case mentioned in proviso (ii) if the owner had not paid the amount of instalment or instalments payable by him before the date mentioned in the proviso; the amount of such instalment or instalments shall be deducted from the lump sum paid by him, and the rebate shall be calculated only on the balance.

(2) Where the betterment contribution is paid in instalments, interest shall be calculated on the contribution amount outstanding at the end of each year at such rate as may be prescribed, and the contribution with interest as so calculated shall be payable in equated annual instalments.

(3) The owner of any land in respect of which any contribution is payable, may instead of making a lump sum payment in cash, surrender to the Government any land the value whereof is, in the opinion of the District Collector, equal to the amounts of the contribution less a rebate as provided in sub-section (1);

Provided that the District Collector may, for reasons to be recorded in writing, refuse to accept any land offered by the owner.

12. Rebate in certain other cases.—If the Government accept or have accepted any money contribution from any person for the construction, expansion or alteration of any work and such person becomes liable to pay contribution in respect of any land benefited or capable of being benefited by such construction, expansion or alteration, the sum accepted from him shall be credited towards the contribution payable by him.

13. Contribution recoverable as arear of land revenue.—Contribution payable under this Act in respect of any land shall be deemed to be public revenue due upon the said land; and the land, its products and the buildings (owned and occupied by the owner) standing upon the land shall be regarded as the security of the contribution. When the whole or portion of an instalment of the contribution payable in any year is not paid on the due date, the amount of the instalment or its unpaid portion and the interest due thereon shall be deemed to be an arear of land revenue and the provisions of the Madras Revenue Recovery Act, 1864 (Madras Act II of 1864) shall apply to the recovery of the said arear as they apply to the recovery of the revenue due on the land.

14. Payment of contribution by person having interest in land .—Any person having interest in a land may, notwithstanding that he is not the owner of such land, pay the contribution payable by the owner in respect of such land and shall, if such person pays the entire contribution in accordance with the provisions of Section 11, be entitled to the rebate provided by that Section.

15. Payment of contribution by actual occupants and ryots with occupancy rights.—Where an owner who has paid an instalment of contribution under this Act is not the occupier of the land he shall, in the absence of a contract to the contrary, be entitled to recover the amount of such instal

ment from the person, other than a tenant, who is in actual occupation of the land during the year in which the said instalment is payable :—

> Provided that, where the owner has paid the entire contribution with a rebate under the proviso to sub-Section (1) of Section 11 a twentieth part of the sum actually paid shall be deemed to be the instalment of the contribution payable during every year during which an instalment of the contribution would have been payable had the entire contribution not been so paid.

16. Exemption.—If, in the opinion of the Government the enforcement of all of the provisions of this Act will cause hardship in any case or cases, the Government may, by notification setting out the ground therefor exempt either permanently or for a specified period, such case or cases for all or any of the provisions of this Act, subject to such conditions, if any, as the Govt. may deem fit to impose.

17. Bar of jurisdiction of Civil Courts. No Civil Court shall entertain any suit or other proceedings to set aside or modify any order or decision passed by the District Collector, the Board of Revenue or the Govt. under this Act or in respect of any other matter falling within the scope of any of those authorities.

18. Power to make rules.—(1) The Govt. may, by notification, make rules to carry out the purposes of this Act and in particular :—

(*a*) for the delegation of their powers to the Board of Revenue, District Collector or other authorities;

(*b*) for the provision of such appeals and revision as may be found necessary in respect of the orders passed by any authority to whom powers may be so delegated;

(*c*) for the procedure to be followed in making inquiries under Section 6 and in disposing of appeals under Section 7;

(*d*) for the manner in service of notices and orders issued under this Act;

(*e*) for the manner in which the instalments of contribution shall be paid;

(*f*) for all matters expressly required or allowed by this Act to be prescribed.

(2) All rules made under this Section shall be published in the Andhra Gazette and upon such publication shall have effect as if enacted in this Act. The rules so made shall be placed on the table of the Legislative Assembly as soon as possible after they are published and shall be subject to such modifications, whether by way of repeal or amendment as the Assembly may make within fourteen days thereafter during the Session in which they are so laid.

19. Saving.—Nothing contained in this Act shall apply to the levy, determination, payment or recovery of betterment contribution from the owners of lands which are benefited, or are capable of being benefited by the construction, expansion or alteration of any work if provision in that behalf is contained in any other law relating thereto and for the time being in force.

(By order of the Governor)

APPENDIX XV

Record of discussions held at Hyderabad on 23rd February, 1960 with the P.W.D. and Agricultural Officers of Andhra Pradesh.

PRESENT

Shri J. C. Hardikar,
Chief Engineer,
Irrigation & General,
Andhra Pradesh.

Sardar Lal Singh,
Member, Minor Irrigation Team.

Shri Mohd. Usman,
Superintending Engineer,
Medak Circle,
Medak.

Shri Shamim Zuharie,
Joint Director of Agriculture,
Andhra Pradesh.

Shri N. V. Joshi,
Executive Engineer,
Mahboob Nagar Division (I.B.),
Mahboob Nagar.

Shri P. Sitaram Rao,
Executive Engineer,
Medak Division (I.B.),
Medak.

Shri N. Venkatesan,
Executive Engineer,
Nalgonda Division (I.B.),
Nalgonda.

Shri M. Kamkelkar,
District Agricultural Officer,
Hyderabad.

Initiating the discussion, S. Lal Singh referred to the following points :—

(i) In Andhra Pradesh, out of about 68 lakh acres of the total irrigated area, about 28 lakh acres are served by irrigation tanks. Compilation of the data of 5,000 tanks in representative districts had revealed that the ratio of water-spread area to the registered ayacut was in the proportion of 10 acres to 13 acres i.e. 1.0 : 1.3. The total water-spread area of about 58,000 tanks in the State on this basis would correspond to about 24.0 lakh acres against an ayacut of 31.2 lakh acres. Although the registered ayacut was expected to be irrigated in full, but the actual area irrigated was in fact less than the registered ayacut, so that by and large the area occupied by the tanks was almost equal to area irrigated by the same.

(ii) Evaporation losses from free water surface of tanks in the State vary from 59″ to 114″ a year, with an average of about 94″. Even if two-thirds of the tank area may be considered on an average filled with water throughout the year, the evaporation losses exclusive of percolation losses would be of the order of 112 lakh acre-feet. This is of course a very rough idea to appreciate the extent of evaporation loss. In this connection, the experiments being conducted in many countries, including India, on the curtailment of such losses were also mentioned.

(iii) Four factors responsible for loss of water were: (a) evaporation from free water surface of the tank—the loss being maximum in the presence of vast expanse of water and shallow depth of tank, (b) percolation losses from the bed of the tank, (c) presence of too many weeds in the tank, (especially with shallow water depth), through transpiration—the total loss being as much as the total water requirement of several crops in equivalent area, and (d) absence of trees around irrigation tanks to serve as wind-breaks as wind velocity very greatly determines the intensity of rate of evaporation. All the above factors are present in the existing tanks to encourage maximum losses.

(iv) The "Desilting-cum-Reclamation Scheme" implied removal of silt from the tank-bed and depositing the same on the fore-shores with a view to reduce the tank area without reducing its storage capacity. The scheme yielded obvious advantages, such as (a) release of rich fertile land, which in the case of Andhra Pradesh even on the basis of 20 per cent reduction, would be about four lakh acres, (b) proportionate reduction in the evaporation and percolation losses consequent upon reduction in the area of the tanks.

(v) Greater use of sub-soil water: Since the water table varied from about 6 ft. to 20 ft. in and around the tank areas, there existed vast scope for the utilization of sub-soil water in the State. Lift irrigation in such cases would prove beneficial at least to the production of non-paddy crops which require lighter irrigation than paddy.

(vi) Modification in crop pattern, so that a small portion of paddy area gives way to non-paddy food crops, was called for on account of (a) limited amount of water available, (b) need for greater production of food, and (c) water requirements of paddy being several times greater than that of many other crops.

2. In the light of these points, the Joint Director of Agriculture, District Agricultural Officer and Executive Engineers of the Irrigation Department participated in the discussion and sought clarification on the various aspects of the "Desilting-cum-Reclamation Scheme". The Joint Director agreed with the salient features of the Scheme. The Chief Engineer also expressed his considered views which may be summarised as under :—

> "He welcomed the main approach to the problem and also agreed in principle with the Scheme which aimed at the creation of new fertile land or reduction in water losses. But he emphasized that the value of land in Andhra Pradesh was not so high as in the adjoining States and, accordingly, the cost incurred on the "Desilting-cum-Reclamation Scheme" might not be recovered in full by the sale of reclaimed lands. He also felt that the saving in evaporation and percolation losses in actual practice might not be realised to

the extent estimated. But he did agree that the Scheme was worth trying, and for this purpose, he had prepared a list of six irrigation tanks where "Desilting-cum-Reclamation" could be started. The water-spread area in these tanks happened to be unusually larger than the ayacut served by the tanks."

3. In this connection, S. Lal Singh stated that it would be desirable to take up tanks (a) where the tank bed area belonged to the Government so that there is no interference by private people and reclaimed land could be sold or otherwise utilized in any manner considerd suitable, (b) where the water-spread ratio to the ayacut was abnormally large, and (c) the price of land was fairly high, as in several places, served by irrigation tanks, the value of land was quite high ranging from Rs. 2,000 to 3,000 per acre. The reason for giving preference to such tanks was that the risk of financial losses would be reduced to the minimum possible and as experience was gained and the work on desilting was systematized, the cost in future would be reduced considerably.

4. There was general agreement on greater utilization of sub-soil water than heretofore, especially in and around the ayacuts of tanks. Certain procedural difficulties in regard to "credit worthiness" of the cultivator for securing taccavi loans for the purpose and existence of rocks here and there in digging wells were pointed out which had to be overcome. The Chief Engineer and S. Lal Singh undertook to discuss the question of taccavi with the Additional Development Commissioner. The Agricultural Officers also agreed with the need for laying greater emphasis on non-paddy food crops and explained the efforts they were already making in this direction.

Record of discussions held on the 24th February, 1960.

Present:

Shri C. Narsimham,
Planning and Local Administration Secretary and
Additional Development Commissioner,
Andhra Pradesh.

Sardar Lal Singh,
Member, Minor Irrigation Team.

Shri J. C. Hardikar,
Chief Engineer, Irrigation and General,
Andhra Pradesh.

The Additional Development Commissioner agreed to the implementation of the Desilting-cum-Reclamation Scheme. He, however, suggested that the scheme be augmented to include at least one hundred tanks of different sizes in different districts. The tanks selected should conform to the conditions that the tank—bed lands belong to the Government, their water-spread ratio to the ayacut was large enough and that the price of land in the area was comparatively high.

2. With regard to the 'credit worthiness' of the cultivators the Additional Development Commissioner explained that the value of the well was not being added to the value of the land in determining credit worthiness for the grant of loan and subsidy (Rs. 750 each).

APPENDIX XVI

STATEMENT SHOWING OBSERVATIONS AND RECOMMENDATIONS OF THE MINOR IRRIGATION TEAM ALONG WITH THE COMMENTS OF THE GOVERNMENT OF ANDHRA PRADESH AND MINISTRY OF FOOD AND AGRICULTURE*, GOVERNMENT OF INDIA.

Paragraph No. of the Summary	Summary of the recommendations of the Team	Comments of the Government of Andhra Pradesh
(1)	(2)	(3)
1.	The Team recommends that the Master Plan for restoring old tanks in Andhra Pradesh be implemented and completed during the Third Five Year Plan. The Team suggests that the following steps be taken to expedite and systematise restoration works :	
	(*i*) Special Survey Circle for Andhra Region may be provided so as to expedite the work of restoration tanks;	A special investigation Circle under the control of a separate Superintending Engineer, with Headquarters at Guntur with 4 Divisions has already been formed for Andhra Region and is functioning. The suggestion is acceptable on the analogy of 'Circle System' which is in vogue in Andhra area in respect of normal maintenance of repairs of M.I. Sources.
	(*ii*) Standards for the 13,000 tanks taken over from the ex-Zamindars should be drawn out on modern principles;	This will be attended to by the above Circle forming some more additional divisions, if necessary, which involves employment of special staff for survey, localisation, repairs and cropping pattern.
	(*iii*) The capacity lost due to silting should be recovered by raising the bunds and waste-weirs. The Desilting-cum-Reclamation Scheme as evolved by the Madras State may be adopted wherever feasible, to reduce submergence;	The suggestion is generally acceptable. It may however, be noted that the desilting-cum-reclamation schemes are very costly and of doubtful permanent utility. They will be financially sound only where we can get a very high price for the land reclaimed usually near towns in deltaic areas etc. It has been decided to take a few tanks as an experimental measure for trying this scheme.
	(*iv*) Cultivation in the fore-shores should be regulated to minimise silting up.	Cultivation in the fore-shore lands may be discouraged to avoid silting up of tanks.
	The Team also recommends speedy research in measures to be taken to minimise evaporation losses, and checking weed-growths in the tank-bed.	The suggestion with regard to speedy research in measures to minimise evaporation may be agreed to. It may, however, be mentioned that Ceytl Alcohol has been tried in some of the reservoirs in Australia for reducing evaporation losses and experiments are being tried by the C.W.&.P.C. The results of the experiments will indicate to what extent and in what cases such artificial control of evaporation losses is practically feasible.

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*On page 85.

(1)	(2)	(3)
2.	In order to achieve uniformity and efficiency in maintenance of tanks in Andhra Pradesh, taking into account the new Panchayat System, the Team recommends that :—	
	(*a*) The Revenue Deptt. may maintain tanks with ayacut from 50 to 200 acres;	In Andhra Region, tanks having ayacut below 200 acres are already being maintained by the Revenue Dept. In Telangana Region all the restored tanks with ayacut below 100 acres have been, as a first step, transferred to Revenue Dept., for maintenance purposes. Gradually all the tanks below 200 acres are proposed to be transferred to the Revenue Dept.
	(*b*) All tanks below 50 acres may be maintained by the Panchayats; (*c*) Maintenance of other tanks may be progressively transferred to the Panchayats when they build up sufficient efficiency and experience;	Panchayat Samithies and Zilla Parishads have recently been formed in the State. The Government have recently passed orders transferring the control of maintenance and ordinary repairs of tanks now under the Revenue Department, to the Panchayat Samithies and Zilla Parishads with effect from 1-7-1960.
	(*d*) Regular maintenance levy may be imposed on the lands irrigated by each tank.	Since wet assessment or water rate is being levied on all lands irrigated from a Government source of irrigation, an obligation rests on the Government to maintain the sources in an efficient working condition. Regarding the maintenance of works relating to outlet such as removal of silt, prickly pear etc., these are generally attended to by the ryots as a measure of customary obligation. In this connection it may be mentioned that the Planning Commission has also suggested payment of communication rate in addition to water rate to meet the cost of repairs and the maintenance of local irrigation work. The matteer is separately under examination.
	In order to ensure proper routine maintenance, the Team recommends a certain minimum annual grant for each tank in addition to special grants for repairs when necessary.	The principle that every tank must get timely attention is self-evident. But the intervals at which the repairs are to be done depend on several factors such as the soils of which the tank bund is made, available free board, size of tanks, height of bund etc. Whether repairs of tanks have necessarily to be made every year or once in two years or more depends upon local conditions. Existing practice in Andhra area and in Telangana area vary in this regard. In the case of tanks over 200 acres which are in P.W.D. control the existing practice may continue. In the case of tanks below 200 acres these are being transferred to the Panchayat Samithies and Zilla Parishads; we can leave to

(1)	(2)	(3)
		Panchayat Samithies and Zilla Parishads to decide on the way in which this money is to be utilised to the best advantage. It may however be stated that it will be advantageous if the annual grant is provided taluq-wise for routine maintenance.
3.	The Team suggests grouping up of a number of small and scattered repair works in the vicinity totalling to about Rs. 50,000, and giving them to bigger contractors, who would then be in a better position to execute the works at reasonable rates, when other agencies are not forthcoming to execute the repair works.	The present policy is to have as few contractors as possible and to encourage the repair works to the tanks being undertaken either by ayacutdars or by Village Panchayats, or by Labour Co-operatives or by the Bharat Sevak Samaj; it would appear undesirable to alter the policy.
4.	With regard to design practices, the Team points out that :—	
	(*a*) With a view to minimise the incidence in silting up of channels from diversion weirs, adequate provision of scour sluice near the canal take-off is necessary. Also wherever feasible, piers and gates may be preferred to solid weirs;	The silting of a diversion channel depends upon various factors such as the location of the off-take of the channel from the main stream, the silt load carried by the main stream during floods, the duration and intensity of floods and hydraulic characteristics of the off-take channel such as the flat or steep fall etc. More provision of scour sluices at every off-take channel may not by itself reduce effectively the silting of the off-taken channels. On this, there is abundant experience. The question of a regulator with vents as an alternative to a solid construction like an anicut has to be decided on merits of each case. Where the supplies in the main stream are not far in excess of demands in the off-take channel, the provision of a shuttered regulator will result in waste by the leakage, where supplies in the main stream are such that a regulator can be effectively worked to reduce silting upstream of the regulator, then only a regulator will generally be useful. An anicut is generally less costly than a regulator. Hence no hard and fast solution such as that suggested by the Team can be taken to be a panacea for all cases.
	(*b*) Adequate surplussing capacities need to be provided so as to avoid frequent breaching of tanks. Tank slopes on the water-side need to be not less than 2:1 where as they could be 1½ : 1 on the rearside;	The question as to what should be considered as an adequate surplussing capacity of a tank depends upon many factors. It is well known that abnormal floods occur once in several years. A one in 1,000 year flood may give several times a discharge which a one in 100 year flood can give. Similarly one in 100 year flood may give much more discharge than one in 30 year flood. It the waste-weir of tanks have to be constructed to provide for such abnormal floods occurring but rarely, the financial burden on the State

(1)	(2)	(3)
		will be such that very few tanks restoration or construction schemes will be feasible. Both in Andhra and Telangana regions, the capacity of waste-weirs is being designed with reference to actual local conditions to provide for the normal maximum flood, based on experience and close study of the Engineers of the Andhra and Telangana regions for well over 100 years. The flood formulae evolved depend upon local conditions of rainfall and local observations of flood flows. It is to be pointed out that the Inglis formula which is quoted by the Team is not relevant to conditions either in Andhra or Telangana. Cloud bursts, of course, are rare occurrences which it is not possible to predict. A study of these cloud bursts which is being made by the Meteorologists is being closely followed and for regions where such cloud bursts are likely to be of frequent occurrence, the flood formulae are already being revised. It may be cheaper to repair a breach in a tank which occurs once in 30 years than to provide for absolute safety by incurring a heavy capital cost on providing a surplus weir for adequate capacity to cope with abnormal floods ever likely to occur. During the recent five years or so there is a feeling that the intensity of rainfall is more than what has occurred in the past. This subject is being closely studied not only by the State Engineers but by Engineers all over the Country. For Reservoirs now being taken up, waste-weirs are designed such more liberally than what has been done before, in consideration of the heavy floods which we experienced in the State in the past five years or so. As regards front slopes and rear slopes of tank bunds as given by the Team it is to be stated that they cannot be taken as universally applicable. Modern methods of design are being adopted for tanks of depths more than 15 ft. And for other tanks, the yard stick of experience is being applied.
	(*c*) The Madras Specification No. 20-A, providing for consolidation and tamping, be applied to all bank-work of tank bunds.	For construction of new tanks, repairs to breaches or improvements to existing tanks, by way of raising bunds etc. this specification is being followed. But for rear surfaces and gullies this specification is not quite necessary. It will be also difficult to ensure adherence to this specification for maintenance works of small magnitude entrusted to the non-technical agencies available for under-taking such repairs.

(1)	(2)	(3)
5.	The Team recommends the following measures to accelerate lift irrigation by pump-sets :—	
	(*a*) Encouraging Diesel-pump-sets until rural electrification is developed by suitably relaxing the criterion that the applicant should possess land worth at least double the loan amount, which is rather too harsh and deters the cultivators from the venture. Loan advances may be also based on the potentials of land rather than on the land assessment, which is normally conservative;	The value of land offered as security is being assessed, not with reference to the assessment of land value it bears, but solely with reference to its present market value. Of the factor determining the present market value of land, its potentiality for wet irrigation is an essential element. This is a highly practicable and useful suggestion.
	(*b*) Encouraging co-operative lift schemes which would enable small farmers to get the benefit of such schemes as a result and publicising the details of successful co-operative lift irrigation schemes so as to popularise the same.	The suggestion is acceptable. In this connection it may be stated that this Govt. have already sanctioned installation of pump sets for lift irrigation purposes on co-operative basis where ryots formed registered co-operative societies. The L.R.R.C. appointed by this Govt. has also suggested that irrigation by direct pumping may be permitted liberally with the previous sanction of the Collectors, who may obtain, if necessary technical advice, levying a small licence fee at the rate of one rupee per horse power of the engine per annum. In all other cases, where power is not used for lifting, it was suggested to fix a nominal licence fee. The recommendations of the L.R.R.C. are now under the active consideration of the Govt.
	The Team suggests that drainage water from upper irrigation ayacut may be picked up by means of diversion weirs and channels to further irrigation, preferably on a co-operative basis, with adequate Govt. help in the form of loans.	The recommendation of the Team presupposes that ample drainage water from upper irrigation ayacut is available to be picked up by means of diversion weirs and channels to further irrigation. In the cases of tanks where usually not a drop of water is wasted by ayacutdars drainage water if any available is already being made use of. In the case of delta systems in flat coastal districts like Godavari, Krishna and Pennar effective water regulation by PWD is done in giving only needed supplies for the irrigation. Steps have already been taken to utilise this drainage water for irrigation, where feasible, by different methods such as allowing lift irrigation, construction of regulators and off-take channels etc. The main consideration is, however, that such obstruction to drainage course does not result in undue submergence of the irrigated lands during local rains. The principle that water must not be wasted can be agreed to. Whether such works are to be undertaken on a co-operative basis or otherwise depends on the magnitude of the work, feasibility of getting ryots to undertake on a co-operative basis etc.

(1)	(2)	(3)
7.	Economic returns as also yield per acre from non-paddy crops are in no way less than those from paddy. Therefore, the Team recommends raising of non-paddy crops. Such a re-orientation in the cropping pattern will result in (a) higher income to the cultivators and greater revenues to the State; (b) bringing additional areas under cultivation thereby augmenting food production; (c) lessening the chances of water-logging and (d) more balanced diet. At present non-availability of water for Rabi crops is mainly due to increased emphasis on cultivation of paddy which consumes majority of the water stored in the tanks. Rice cultivation should, therefore, be confined to those areas only where its production potential is high. The remaining areas should be put under other crops needing less water. Also, water required for Rabi crops should be obtained by resorting to intensive lift irrigation.	The suggestion is acceptable. It is observed in the L.R.R.C. report that for giving quantity of water, more food can be produced through light irrigated dry crop-rather through paddy. Keeping this in view, suitable cropping pattern has to be evolved for each area to achieve the object of the Team. However it may be mentioned in this connection that to change the food habits of the people all of a sudden may not be practicable. Where plenty of water is available for wet irrigation and there is irrigation almost over the entire area under the channel systems such as Krishna, Godavari deltas, a change over to dry crops in these areas, even if we are able to achieve this by legislation or otherwise, will not result in getting more area under cultivation but will only upset the existing economics. Other deficit States like Kerala will suffer if Andhra fails to produce the rice required. Subject to this it is agreed that encouragement of irrigated dry crops is necessary specially in districts like Rayalaseema and portions of Telangana.
8.	The Team recommends (i) preservation of soil-fertility by increased use of green and artificial manures and rotation of crops and (ii) application of super-phosphates for counteracting harmful effects of salinity and alkalinity in the soil, particularly in the low rainfall areas of Nalgonda and Hyderabad districts.	Acceptable.
9.	It is recommended that necessary steps may be taken by the State Authorities to have water channels constructed even by acquiring the necessary lands from the individual owners, so as to reduce loss of water due to extra evaporation and percolation while passing through the fields.	The Team apparently has in its mind the provision of field channels in the case of some tanks where field to field irrigation is practised at present as a time honoured custom. One should be sure, before disturbing this custom, as to whether the results anticipated really warrant the interference. In the case of new irrigation systems including reservoirs and tanks field channels are invariably provided as per the standard methods. Even in the case of existing tanks in many cases, ryots have already formed the field channels by themselves where they considered it worth while. However, the change-over to the system of irrigation by field channels instead of field to field can be taken up for propaganda by the Panchayat Samithies and Zilla Parishads. However with a view to accelerate the development of ayacut under the projects it was ordered that in the case of all irrigation projects field channels should be excavated at Govt. cost upto the periphery

(1)	(2)	(3)
		of each distinct wet block, subject to a maximum limit of 25 acres and the case of blocks to be irrigated for dry areas, upto each individual survey number. Accordingly provision of field channels is being pursued simultaneously with the execution of the head works, so that by the time waters are impounded in the irrigation work, the requisite facilities for their conveyance to individual fields are also completed.
10.	With a view to enhancing the returns to the Govt. from irrigation works, steps may be taken to carry out a detailed study regarding the current water-rates. The Team points out the large scope for upward revision of water rates and recommends introduction of uniform and increased rates on a rational basis, in accordance with the recommendations of the 'Taxation Enquiry Commission'. The Team also recommends implementation of the Betterment Act.	The L.R.R.C. appointed by this Govt. examined the existing charges for water in detail. The Committee have dealt with the revision of rates of charge for irrigation by a grouping of soils and reclassification of irrigation sources taking into account the recommendation of the 'Taxation Enquiry Commission' and made their recommendations. With regard to suggestion of the Team for implementation of the Betterment Act, it may be stated that this Act 'Andhra Irrigation (Levy of Betterment Contribution) Act *viz.*, XXV of 1955 is in force. The rules under the Act have been formulated and the Collectors are taking steps to collect the contribution in cases where they are due by observing the legal formalities.

APPENDIX XVI (*concld.*)

Krishan Chand, I.C.S.,
Joint Secretary.

D.O. No. PA/JSD/115/60.
Government of India
MINISTRY OF FOOD & AGRICULTURE
(Department of Agriculture)
Dated the 14th April, 1960.

My dear Borker,

Please refer to your letter No. COPP/I&P/28/59/689 dated 30th March, 1960, addressed to Shri Damle. We have gone through the draft Report on Minor Irrigation Works in Andhra Pradesh submitted by the Minor Irrigation Team and have no comments to make.

Yours sincerely,

Krishan Chand.

Shri D. S. Borker,
Secretary, Consultative Committee,
Irrigation & Power Projects,
Committee on Plan Projects,
Yojana Bhavan,,
NEW DELHI.

M1COPP(PC)—1,500—21-7-60—(Sec. II)—GIPF.

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